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The Pan-Pacific Entomologist

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THE ICHTHYURINI OF NORTH AMERICA

(Coleoptera: Cantharidae)

KENNETH M. FENDER [1]

Linfield Research Institute, McMinnville, Oregon

The tribe Ichthyurini may be recognized by the small size of the beetles, 2.5–9 mm., abbreviated elytra, which are narrowed and dehiscent for the apical half or more of their length, leaving the secondary or flying wings largely exposed, the securiform or cultellate apical palpal segments, the small and quadrate mentum, and the male aedeagi which are asymmetrical and strikingly similar to those of *Chauliognathus*.

On the basis of the similar male genitalia and the fact that some species of *Chauliognathus* have somewhat apically narrowed and dehiscent elytra, this tribe should be placed between the Chauliognathini and the Cantharini.

In the new world, the Ichthyurini attain their greatest diversity in the tropics. They are represented in North America by only six species in three genera.

KEY TO THE GENERA OF ICHTHYURINI

1 Antenna bases approximate, terminal abdominal segments forcipiform ..... *Ichthyurus* Westwood

1′ Antennal bases separated, terminal abdominal segments not forcipiform

2 Tarsal claws appendiculate..... *Trypherus* LeConte

2′ Tarsal claws simple..... *Belotus* Gorham

ICHTHYURUS Westwood

This genus is readily distinguished by its short, dehiscent elytra; antennae approximate; the eyes very large, extending nearly to the base of the mandibles, inwardly emarginate, giving a hymenopteroid appearance when viewed frontally, separated by the combined widths of the antennal sockets; the seventh visible abdominal segment bilobate or forcipiform (Fig. 4); the claws slender and acute, armed with a large acute tooth, the teeth of each pair of claws closely overlapping to form a large platelike process between the claws (Fig. 2).

ICHTHYURUS ARIZONENSIS Fender

Ichthyurus arizonensis Fender, 1948, Wasmann Coll. 7:121–122

Nigro-piceus; mandibles fuscous, pronotum piceous with the margins narrowly paler, these pale areas more extensive near the angles; scutellum

[1] This study was supported by National Science Foundation Grant G-7112.

piceous, elytra flavous with the suture rather widely infuscate from base to a little beyond the point of dehiscence; abdomen brunneus to the apical segment which is nigro-piceous in the female. Length 6 mm.

Male.—Unknown.

Female.—Head longitudinally concave behind antennae, surface finely microreticulate, apical segment of maxillary palpi cultellate, not as long as preceding two segments combined; pronotum transverse, microreticulate and finely sparsely punctate, pubescence evident, the anterior margin and sides more or less evenly rounded to the obtuse hind angles, strongly dehiscent apically, ultimate tergite produced on each side into subconical processes (Fig. 4).

This species is known only from the type series, a pair of dilapidated females from the Leng collection. They were collected in the Huachuca Mts., Arizona, July 1905. The types are in the collection of the California Academy of Sciences.

Trypherus LeConte

Trypherus LeConte, 1851, Proc. Acad. Nat. Sc. Phila. (2)5, p. 346.
Lygerus Kiesenwetter, 1852, Linn. Ent. 6, p. 246.

Eyes moderately large and prominent, the inner margins convex, separated one and a half times the width of the combined antennal sockets; antennae separated; apical maxillary palpal segment elongate securiform; claws similar to *Ichthyurus*, the claw proper somewhat stouter (Fig. 1).

Key to the Species of Trypherus

1 Mesofemora not dilated in the male (female unknown)
2 Apical flavous area of elytra short, transverse; right ventral process of apical abdominal armature of male triangularly foliate ..... *pauperculus* Fender
2′ Apical flavous area of elytra as long as wide; right ventral process of apical abdominal armature of male large, ovate.... *blaisdelli* Fender
1′ Mesofemora dilated in the male, twice as wide as others; mesofemora normal in the female
3 Pronotum evidently transverse; right ventral process of apical abdominal armature of male transverse digitate.. *latipennis* (Germar)
3′ Pronotum subquadrate, nearly as long as wide; right ventral process of apical abdominal armature of male transverse, longate securiform; pale margins of pronotum usually very narrow in the female..... *frisoni* Fender

Trypherus pauperculus Fender, new species

(Figs. 5, 9)

Head black, front and bases of mandibles eburneous, palpi piceous, antennae piceous with basal two or three segments pale beneath and basally; prothorax testaceous, pronotum with a large, transverse, irregular piceous spot, margins of which are indented near the anterior angles and medially at the base; elytra piceous, becoming darker beyond the middle,

testaceous below the humeri; apices narrowly transversely flavous; mesothorax testaceous with the sides somewhat infuscate; metathorax piceotestaceous medially and anteriorly, becoming piceous posteriorly and towards the sides, sutures somewhat paler; abdominal sternites piceous, sides and apices rather widely flavous; all coxae and trochanters testaceous, front legs testaceous with dusky tarsi, middle legs testaceous with femora and tibiae fuscous above, hind legs piceous with tarsi somewhat paler; pubescence cinereous, sparse, subdecumbent to suberect. Length 3.5 to 4 mm.

Male.—Head wider than pronotum, eyes large and prominent, separated by one and one-third times width of an eye, membranous clypeus biarcuate, protuberant, front smooth, shining, apically bisinuate, apical segment of maxillary palpi shorter than second and third combined, head behind antennae and between eyes strongly transversely concave, microreticulate, becoming finely sparsely punctured on sides of neck; pronotum transverse, anterior margin evenly arcuate, anterior angles feebly prominent, feebly depressed and explanate, sides short, nearly straight, converging slightly to rounded hind angles, basal margin sinuate each side of middle, base strongly margined, apex margined with a row of hyphenated punctures, disc medially flattened, feebly shining, very finely microreticulate; elytra a little over twice as long as pronotum, apices separately rounded, dehiscent beyond apical fourth, alutaceous, sparsely, coarsely, confusely punctured; body beneath feebly shining, pubescence fine, sparse and decumbent; penultimate tergite widely shallowly emarginate at the apex, hind angles not obliquely produced as tubuliform processes, ultimate tergite narrower, short, with a narrow, deep median incision extending nearly to base of segment, sixth sternite widely shallowly emarginate apically, seventh sternite widely deeply emarginate apically, apex of emargination arcuate, sides sinuate, apical angles acute; right ventral process large, subfoliate, caudally produced, left ventral process podiform, smaller than the right, median spiniform process feebly sinuate (Plate 1, Fig. 4).

Female.—Unknown.

Holotype male: Elizabethtown, Hardin County, Illinois, June 25, 1932, collected by Ross, Dozier and Park, in the collection of the Illinois Natural History Survey. Paratype (1), Greene Co., Ohio, V1-2, collected by D. J. and J. N. Knull, in the Knull collection.

Trypherus blaisdelli Fender, new species

(Figs. 6, 10)

Head testaceous to flavotestaceous in front, piceous to black behind middle of eyes, with a narrow median prolongation extending to and between antennae, antennae piceous, basal segment flavous, second and third segments flavous beneath; pronotum testaceous with a wide trifoliate, brunneous discal spot extending to lateral margins, basal margin narrowly and apical margin widely pale, anterior angles with large subquadrate pale areas, posterior angles widely pale; scutellum testaceous; elytra brunneous, humeri obscurely paler, the apical fourth flavous, these pale

areas extending narrowly down lateral margins to basal third; body beneath flavous, trochanters, coxae and bases of femora flavous, legs piceous apically, fifth and sixth sternites infuscate, seventh fuscous, seventh tergite castaneous; pubescence aureous, fine, sparse, and suberect. Length 4 to 5.5 mm.

Male.—Head shining, slightly wider than pronotum, concave between large, prominent eyes, impunctate in front, finely microreticulate and with fine, sparse punctures behind, more coarsely punctured on sides of neck, antennae slender, intermediate segments about three times as long as wide; pronotum shining, transverse, anterior margin evenly arcuate to more sharply rounded anterior angles, sides nearly straight, converging slightly to obtusely rounded hind angles, posterior margin arcuate medially, becoming sinuate towards sides, apex and sides not margined, base deeply margined, disc very finely microreticulate and finely sparsely punctulate, punctures confusedly and unevenly distributed; scutellum alutaceous, subquadrate, apex feebly incised; elytra dehiscent from a little beyond middle, alutaceous, finely sparsely punctured basally, more coarsely so and feebly rugulose apically; body beneath weakly shining, finely punctulate, legs normal, mesofemora not dilated; sixth sternite broadly shallowly emarginate apically, seventh sternite broadly deeply emarginate, apex of emargination shallowly arcuate, a wide impression extending nearly to base, a large ovate ventral process extending posteriorly from right half of emargination, a smaller digitate ventral process extending obliquely from left half of emargination, internal to these a short ovate median process, seventh tergite elongate, sides enveloping the sides of the seventh sternite, hind angles produced into conical tubuliform processes each with an apical cusp, apical margin widely shallowly emarginate; eighth tergite short, transverse, apex arcuately produced at the middle, a pair of terete ovate lobes descending from apex.

Female.—Unknown.

Holotype male: Bolivar, Polk County, Missouri (no date), collected by Blaisdell, in the collection of the California Academy of Sciences. Paratypes: "Ill."; Homer, Illinois.

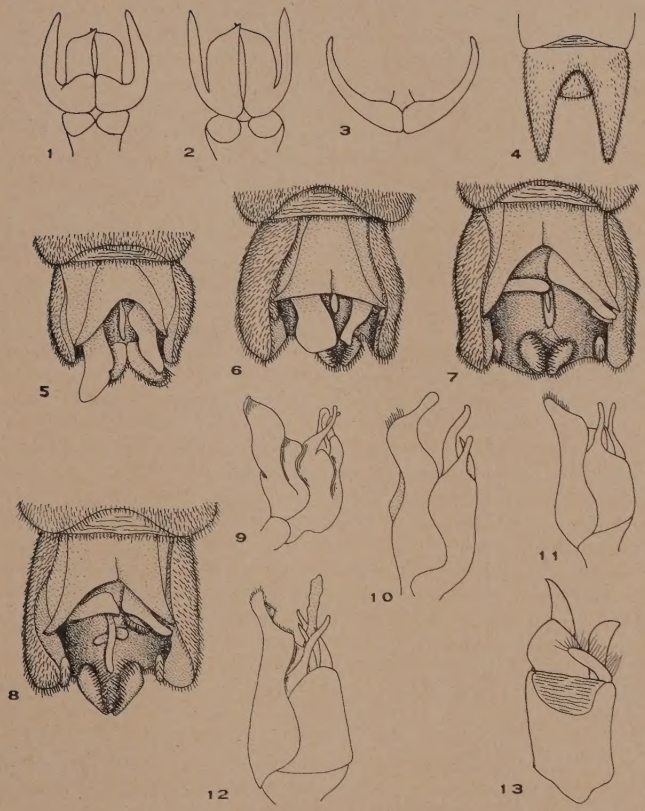
This species can be readily separated from *T. latipennis* and *T. frisoni* by its normal mesofemora and from *T. pauperculus* by its large apical elytral marks.

Trypherus latipennis (Germar)

(Figs. 1, 7, 11)

Malthinus latipennis Germar, 1824, Insectorum species novae, Halae, p. 72.
Molorchus marginalis Sap, 1824, Long's Expedition 2, p. 192.
Trypherus latipennis LeConte, 1851, Proc. Acad. Nat. Sc. Phila., p. 346.
Lygerus latipennis Kiesenwetter, 1852, Linn. Ent. 6, p. 246.
Trypherus latipennis LeConte, 1881, Trans. Am. Ent. Soc. 9, p. 58.

Testaceous to flavotestaceous, eyes black, head behind basal half to third of eyes castaneous; pronotal disc with a large castaneous spot of irregular outline, pale margins usually widest at angles and medially on basal margin, all margins wider in female; elytra castaneous to flavotestaceous, usually with outer margins, humeri and bases more or less pale,



Explanation of Plate

Figs. 1–3, tarsal claws; 1. *Trypherus latipennis* (Germar); 2. *Ichthyurus arizonensis* Fender; 3. *Belotus abdominalis* (LeConte); fig. 4. terminal abdominal segments of *Ichthyurus* sp., female, dorsal aspect;

Figs. 5–8, terminal abdominal segments of male, ventral aspect; 5. *Trypherus pauperculus* Fender; 6. *Trypherus blaisdelli* Fender; 7. *Trypherus latipennis* (Germar); 8. *Trypherus frisoni* Fender;

Figs. 9–12, male genital armature, lateral aspect; 9. *Trypherus pauperculus* Fender; 10. *Trypherus blaisdelli* Fender; 11. *Trypherus latipennis* (Germar); 12. *Trypherus frisoni* Fender; fig. 13. male genital armature of *Belotus abdominalis* (LeConte), dorsal aspect.

apices flavous, this flavous area nearly as long as wide with basal margin oblique, often produced down lateral elytral margins; metasternal epimeron castaneous, thorax beneath usually testaceous, sclerites sometimes castaneous with pale sutures; abdomen testaceous to flavocastaneous, margins widely pale, seventh sternite usually darker; last two tergites castaneous to flavocastaneous; legs flavous, metafemora more or less widely piceous, annulate beyond middle, metatibiae piceous with bases pale; pubescence aureous, fine sparse and suberect. Length 6.5 to 9 mm.

Male.—Head shining, impunctate in front, very finely microreticulate and finely punctured behind eyes, more coarsely so on sides of neck, head shallowly transversely concave between eyes, eyes large and prominent, separated by about one and a half times width of an eye, apical palpal segment longer than second and third segments combined, membraneous clypeus protruding, biarcuate; pronotum transverse, sides straight and parallel, anterior margin arcuate and more or less widely margined, anterior angles obliquely rounded, hind angles arcuate, basal margin rather widely deeply margined, sinuate each side of middle, disc finely microreticulate, unevenly and confusedly punctured; scutellum rounded with a small apical notch; elytra more coarsely microstrigulose, confusedly punctured with interspersed fine and coarse punctures, dehiscent at about the middle; body beneath finely microreticulate, seventh sternite with sides somewhat enfolded by sides of seventh tergite, apically subtriangular emarginate, the emargination wide and deep, sides sinuate, apex rounded; left ventral process digitate, directed transversely in, inside these a median spiniform process directed caudally; posterior angles of seventh tergite subangulately produced as short stout tubuliform processes, apex shallowly emarginate; eighth tergite transverse, bisinuate, a short cordiform process with a median tubercle descending from the apex, mesofemora dilated, twice as wide at middle as the others.

Female.—Similar to male, eyes a little smaller and less prominent, mesofemora not more dilated than others, sides of seventh tergite recurved but not enveloping sides of semicircular seventh sternite, the tergite transversely cordiform, hind angles more strongly produced inwardly and tubulate, apical margin narrowly deeply triangularly emarginate.

LeConte recorded this species from Pennsylvania, Georgia and Virginia. I have studied specimens from the following localities: GEORGIA: Stone Mt., Rabun Co.; ILLINOIS: Oakwood; KENTUCKY: "Ky."; MARYLAND: Beltsville, "Md."; MISSOURI: Branson; NEW JERSEY: S. Orange; NEW YORK: Nyack, "N.Y.," "S.I." (Staten Island?); OHIO: Delaware Co., Franklin Co., Hocking Co., Scioto Co., Shawnee Forest; PENNSYLVANIA: Lingleston; SOUTH CAROLINA: Clemson College; VIRGINIA: Fairfax Co., "Va."

Trypherus frisoni Fender, new species

(Figs. 8, 12)

Head brunneous to castaneous, testaceous to flavotestaceous in front

of eyes, tips of mandibles darker, palpi flavotestaceous with apical segment flavocastaneous, pronotum testaceous to flavotestaceous, median discal spot large, trifoliate, brunneous to castaneous, not or seldom attaining lateral margin in male, usually larger in female, pronotum castaneous, margins very narrowly pale, more widely so at anterior angles; scutellum testaceous to flavotestaceous; elytra piceobrunneous, tips widely obliquely flavous to flavotestaceous and humeri narrowly flavotestaceous, markings discontinuous along lateral margins, epipleurate pale, usually darker medially; body beneath testaceous, metathorax often darker medially, lateral margin of metasternal epimeron darker, coxae, tronchanters and bases of femora testaceous; tibia, tarsi and apices of femora darker, becoming castaneous on hind legs; abdomen flavotestaceous apical segment darker, at times becoming castaneous; pubescence aureous, short, sparse and suberect. Length 6 to 9 mm.

Male.—Head shining, transversely concave between eyes and in back of head, impunctate in front of antennae, finely, moderately closely punctate behind, more coarsely so on sides of neck, antennae long and slender, extending to apical fourth of elytra, intermediate segments about three times as long as wide; pronotum transversely subquadrate, nearly as long as wide, anterior margin evenly arcuate and widely, shallowly margined to the rounded anterior angles, sides straight, not margined, nearly parallel to the rounded hind angles, posterior margin sinuate each side of middle which is narrowly shallowly indented, base more narrowly deeply margined, disc shining, finely sparsely unevenly punctulate, a broad shallow horseshoe shaped depression medially near base, extending anteriorly to middle; scutellum quadrate, very finely punctulate; elytra short, extending to middle of first sternite, dehiscent beyond middle, more coarsely microreticulate, finely confusedly punctate; body beneath very finely punctured, mesofemora dilated, medially about twice as wide as the others; seventh sternite widely deeply emarginate, apex of the emargination rounded, an elongate securiform ventral process arising from right side of the emargination and directed transversely inward, a podiform ventral process arising near middle of the emargination and directly outward towards left side, internal to these an elongate spiniform process, apically ascending; seventh tergite half again as long as sixth, sides strongly descending and recurved to envelope sides of seventh sternite, hind angles triangularly produced and with a small apical cusp, apical margin widely shallowly emarginate; eighth tergite short, transverse, apically arcuate, with an apical sharply descending bilobate saucer shaped process.

Female.—Similar to male, dark markings broader, mesofemora not dilated, seventh tergite broadly semicircular in general outline, apically produced each side of the middle into large tubulate processes, narrowly deeply emarginate between the processes, apex of the emargination rounded, eighth tergite short, narrow, apically arcuate; seventh sternite transverse, the apex arcuate to the triangularly produced middle.

Holotype male: STRANG, MAYES COUNTY, OKLAHOMA, June 18, 1939, collected by Kaiser and Nailon, in the collection of the

Illinois Natural History Survey. Allotype female, Prophetstown, Whiteside County, Illinois, July 7, 1925, T. H. Frison, collector, in the collection of the Illinois Natural History Survey. Paratypes: ILLINOIS: De Kalb, Evanston, Homer Park, Moline, Prophetstown, Rock Island, Urbana, Vermillion Co.; IOWA: Sioux City; KANSAS: Lawrence; MINNESOTA: Hennepin Co., Olmstead Co., river near Shakopee, Shakopee; OHIO: Hocking Co., Pickaway Co.; OKLAHOMA: Elco Springs, El Reno, Flint, Grove, Taloga.

BELOTUS Gorham

Belotus Gorham, 1881, Biol. Centr. Am., Coleop. III, 2, pp. 99, 308. (1885) (Sine descr.).

Lobetus LeConte, 1881, Trans. Am. Ent. Soc. 9, pp. 58–59 (nec. Keisenwetter).

Head moderately developed, mandibles toothed, antennae simple, apical palpal segments stout and subsecuriform, pronotum subquadrate, elytra abbreviated and apically dehiscent, claws simple (Fig. 3), penultimate abdominal tergite emarginate, ultimate sternite elongate oval, capping the asymmetrical genital armature.

BELOTUS ABDOMINALIS (LeConte)

(Fig. 3, 13)

Malthinus abdominalis LeConte, 1851, Proc. Acad. Phil. 5, p. 347.

Lobetus abdominalis LeConte, 1881, Trans. Am. Ent. Soc., 9, p. 59.

Belotus abdominalis Gorham, 1881, Biol. Cent. Am., 3 (2), pp. 99, 308, pl. 6, fig. 8.

Dark reddish brown, basal three segments of antennae and bases of palpi somewhat paler, head in front of middle of eyes, pronotum, scutellum and elytral apices flavous to flavotestaceous, apical and lateral margins of abdominal sternites more or less widely testaceous, legs pale brunneous, pubescence cinerous, fine, sparse and suberect, short on head, pronotum and body beneath, longer on the elytra. Length: male, 2.5 to 4 mm.; female, 3 to 5 mm.

Male.—Head shining, moderately large, slightly wider than pronotum, concave between eyes; labium finely alutaceous, narrow, apically notched, sinuate towards sides; clypeus apically arcuate, sides oblique, coarsely closely punctured; front finely sparsely punctured; back of head and neck more coarsely closely punctured; eyes moderately large and prominent; antennae remote at bases, closer to eyes than each other, second segment subquadrate, third slightly longer, intermediate segments two and a half times as long as wide; maxillary palpi stout, apical segment terete, subsecuriform, penultimate short and transverse; pronotum subquadrate, longitudinally concave, anterior edge arcuate, not margined, anterior angles sharply rounded, depressed, sides straight, parallel, feebly convergent or

feebly divergent to rounded hind angles, posterior edge margined nearly to angles, median third straight, oblique each side to the hind angles, disc shining, finely sparsely punctured, scutellum apically rounded, finely punctured; elytra dehiscent beyond middle, lateral margins converging to acutely rounded apices, alutaceous, coarsely rather closely punctured, somewhat rugose medially; body beneath alutaceous, finely closely punctured, last sternite elongate oval, cupped to enclose genital armature, claws simple, feebly dilated towards base.

Female.—Similar to male, larger average size, eyes smaller and less prominent, third antennal segment half again as long as second, scutellum apically rounded to apically truncate, last sternite apically narrowed, hind angles rounded, apex widely shallowly arcuately emarginate medially, the surface finely postulate.

LeConte recorded this species from Georgia, Florida and Texas; Champion cited it from Southern United States, Mexico, Guatemala, Honduras and Panama as did Blackwelder who may have used Champion's records. Specimens have been studied from: FLORIDA: Baldwin, Jacksonville, LaGrange in Brevard Co.; GEORGIA: Billy's Island in Okefenoke Swamp; KANSAS: "Kans."; OKLAHOMA: Henryetta, Pawnee Co., Stillwater; TEXAS: Brownsville, Cypress Mills, Dallas, Davis Mts., Gillespie Co., Seabok, Uvalde Co., Val Verde Co.

I am indebted to the following persons and institutions for the loan or gift of specimens for this study; to: J. N. Knull of Ohio State University, Milton W. Sanderson and H. H. Ross of the Illinois Natural History Survey, J. W. Green and E. S. Ross of the California Academy of Sciences, C. P. Alexander of the University of Massachusetts, John H. Robinson. To these and to any I may have omitted, I am most grateful.

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INTERNATIONAL COMMISSION ON ZOOLOGICAL NOMENCLATURE: NOTICE OF PROPOSED USE OF PLENARY POWERS IN CERTAIN CASES (A.[N.S.] 44)

In accordance with a decision of the 13th International Congress of Zoology, 1948, public notice is hereby given of the possible use by the International Commission on Zoological Nomenclature of its plenary powers in connection with the following cases, full details of which will be found in *Bulletin of Zoological Nomenclature*, Vol. 17, Parts 6–8, published on 8 April, 1960:

(1) Validation of the generic name *Delphax* Fabricius, 1798 (Class Insecta, Order Hemiptera), Z.N. (S)47;

(2) Designation of a type-species for the nominal genus *Macropsis* Lewis, 1834 (Class Insecta, Order Hemiptera), Z.N. (S)456;

(3) Suppression of the generic name *Promecopsis* Duméril, 1806 (Class Insecta, Order Hemiptera), Z.N. (S)483;

(4) Suppression of the specific name *longicorne* Latreille, 1804 (*Acrydium*) (Class Insecta, Order Orthoptera), Z.N. (S)675;

(5) Stabilization of the names of the North European species of the *Tipula oleracea* group (Class Insecta, Order Diptera), Z.N. (S)896;

(6) Validation of the familiar usage of the generic name *Tanytarsus* van der Wulp, 1874 (Class Insecta, Order Diptera), Z.N. (S)1245;

(7) Designation of a neotype for the nominal species *Dytiscus cinereus* Linnaeus, 1758 (Class Insecta, Order Coleoptera), Z.N. (S)1389;

(8) Validation of the generic name *Acilius* Leach, 1817 (Class Insecta, Order Coleoptera), Z.N. (S)1391;

(9) Validation of the specific name *dardanus* Brown, 1776 (*Papilio*) (Class Insecta, Order Lepidoptera), Z.N. (S)1403.

Any zoologist who wishes to comment on any of the above cases should do so in writing, and in duplicate, as soon as possible, and in any case before 8 October 1960. Each comment should bear the reference number of the case in question. Comments received early enough will be published in the *Bulletin of Zoological Nomenclature*. Those received too late for publication will, if received before 8 October 1960, be brought to the attention of the Commission at the time of commencement of voting.

All communications on the above subject should be addressed as follows: The Secretary, International Commission on Zoological Nomenclature, c/o British Museum (Natural History), Cromwell Road, London, S.W. 7, England.—W. E. China, *Assistant Secretary, International Commission on Zoological Nomenclature*.

OBSERVATIONS ON THE HABITS OF OXYBELUS SERICEUM ROBERTSON

(Hymenoptera: Sphecidae)

R. M. BOHART AND P. M. MARSH
University of California, Davis

The discovery of a large nesting site of *Oxybelus sericeum* Robertson two miles northwest of Goleta, Santa Barbara County, California, made possible a number of interesting observations on the behavior of this wasp. The nest area extended along a strip of sand bordering a lagoon back of the ocean. This area was approximately 150 feet long by two feet in width and contained many hundreds of nests. The primary study extended over a 23 day period from June 23 to July 15, 1959, and additional observations were made more than a month later. Wasp activity began at about 8:00 a.m. Pacific Standard Time on a clear day and at about 9:00 a.m. on a day with low overcast of fog. Activity tapered off about 4:00 p.m. and ceased at 5:00 p.m. High daily temperature during this time ranged between 75°F. and 83°F.

Nest-building.—A typical burrow is constructed in moist, solid sand, free of vegetation. It is about 90 mm. deep, 3 mm. in diameter, straight down and terminating in 1-4 cells in a cluster. The female burrows into the sand head first, pushing the sand out of the hole with her hind legs as she proceeds. The cells are unlined oval chambers about 9 mm. long. The female takes about two hours to complete a burrow and one cell, after which she smooths the sand pushed out of the nest entrance and flies off for provisions.

After the first cell is provisioned the female goes head first into the burrow, closing the entrance behind her with sand which is apparently excavated from a second cell. Occasionally, over a two hour period sand is forced from the entrance. Then the female emerges head first, smooths the area around the entrance and flies away for more provisions. Ordinarily a nest will be completed over a period of two days, and a female will build several nests in her lifetime.

Provisioning.—The observed prey in 16 cells involving five separate nests and more than 200 flies were exclusively ephydrids, *Ephydra riparia* Fallen (identified by W. W. Wirth). These flies were abundant on the surface of the brackish lagoon adjacent to

the nesting site. However, a variety of other flies of similar size were numerous in the area. Female *Oxybelus* were observed many times lighting on the sand near the nest, the paralyzed fly held by the hind legs of the wasp. The female straddled the fly which was ventral side up, facing forward, and extending well behind the body of the wasp. Portal to portal provisioning time averaged about two minutes, and 15-25 seconds were consumed in placing the fly in a nest. The cells examined had 10 to 20 paralyzed flies with an egg laid on the prosternum of the first prey member placed in the cell. Including mating activities described below, a single cell was provisioned in about 45 minutes.

Mating.—Many males were seen in the area about flowers and lighting on the sand of the nesting site. At all times there appeared to be an excess of males over females. Before starting a burrow a female mates, copulation taking place on the sand with the male in the superimposed position for 15 to 30 seconds. During this period the male uses his antennae to tap his mate on her face, rapidly but intermittently. If disturbed the pair may separate or will fly a few inches away. After completion of the burrow and one cell, a female again pairs off with a male, who takes a position on the sand near the nest entrance and strikes at any insects approaching it, including dipterous parasites, pompilids, bembicids, and rival male *Oxybelus*. Each time the female arrives at the nest with prey the male jumps on her and copulation takes place. Exceptions to this routine occur when the male is defending the nest and the female may proceed directly into the burrow. Occasionally, a female hesitates upon leaving the nest and mating takes place under these circumstances, also.

Marking experiments indicated that females are monogamous while provisioning a particular cell, but the male disappears while she is constructing a new cell. She then pairs off with a new mate. In one case a female completed a nest with four separate males and the following day started a new nest with the help of the original male. It was estimated that normal nest-building activity for a female might involve 50 or more periods of copulation in a day.

Larvae.—Length of larval life was not observed, but several cocoons were found. These were fashioned of agglutinized sand grains.

Parasites.—Small miltogrammine sarcophagids were always in association with the wasps. They continually buzzed around the females and occasionally struck them in what appeared to be larviposition. Several cells were found with parasitic maggots or puparia which were reared to adults identified by H. J. Reinhard as *Senotainia litoralis* Allen.

Seasonal History.—At the time of the first observations, June 23, all stages of *O. sericeum* from egg to adult were found at the breeding site. Activity continued at a high rate through July 15. The site was revisited August 20 and the colony appeared to be even more vigorous. This leads to the supposition that there are a series of overlapping broods during the warmer months. Previous California records taken from Bohart and Schlinger (1957) give a collecting span from June 19 to September 1.

Discussion.—A brief summary of *Oxybelus* biology was given by Bohart and Schlinger (1957). Krombein (1955) described the subspecies *crocatum* of *sericeum* and gave the following biological note based on observations of H. E. Evans, the collector. "Dr. Evans writes that these specimens were taken on a small beach of white sand along the Gulf (Pascagoula, Mississippi), with adjacent salt marsh and mud banks. Numerous individuals were flying around close to the sand and landing on it, and several pairs were flying in copula. One female was taken with prey, an otitid fly, *Chaetopsis fulvifrons* (Macq.). The fly is carried beneath the wasp during flight." This reference to pairs in copula may be significant in the light of the rather extraordinary mating behavior outlined above.

Previously published notes on nesting behavior in American species were based on *O. uniglumis quadrinotatum* Say, a relatively common form. Peckham and Peckham (1898), Parker (1915), and Williams (1936) have given similar accounts. The habits of *quadrinotatum* appear to differ from those of *sericeum* in several important details. First, the nest entrance is closed each time the female leaves in search of prey. Secondly, the prey is carried impaled on the sting. Thirdly, a variety of flies are utilized, including therevids, anthomyiids, calliphorids, sarcophagids, and muscids. Fourthly, no mention was made of mating habits, which were presumably unobtrusive. Ferton (1902), referring to European species, postulated that *Oxybelus* which carry the

prey impaled on the sting cover the nest entrance on going out, whereas those which clasp the prey by means of their hind legs leave the entrance open. *O. sericeum* obviously belongs in the latter category. More noteworthy are the unusual mating habits with frequent copulation and defense of the nest by the male.

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NEW NAMES IN THEREVIDAE AND BOMBYLIIDAE
(Diptera)

In the July 1959, number of Pan-Pacific Entomologist I proposed the name *nana* for the preoccupied *Thereva pygmaea* Cole (1923). I succeeded in setting up another homonym — this time a name preoccupied by *Thereva nana* Fallén (1820, Dipt. Suec. Rhizom., 4.4), now in the genus *Catharosia* of the Tachinidae. I propose the name *nanella*, with a hope for final stability.

I am informed by Dr. R. H. Painter that *Villa arenicola* Cole (1923, Proc. Cal. Acad. Sci.) is preoccupied by *Villa lateralis arenicola* Johnson (1908, Psyche, XV, p. 14), described as an *Anthrax*. I propose the name *psamminus*, from the Greek, "of the sand."—Frank R. Cole, *University of California, Berkeley*.

TAXONOMIC STUDIES ON SOME NEOTROPICAL LEPTOPHLEBIID MAYFLIES

(Ephemeroptera: Leptophlebiidae)

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The family Leptophlebiidae is found throughout the world and is frequently encountered in collections from Central and South America, where it forms a large and interesting part of the mayfly fauna. This paper consists of the descriptions of seven new species and notes on several others, all of which belong to this group. For the most part, the specimens considered here are from a large collection made for me by Fritz Plaumann in Nova Teutonia, province of Santa Catarina, Brazil (lat. 27°-11′, long. 52°-23′; elevation 300-500 m.), and they are in my personal collection unless stated otherwise. Also, I have taken this opportunity to report upon a new species from Chile in the collections of the Illinois Natural History Survey.

GENUS THRAULODES Ulmer

At present, this genus consists of 21 described and named species. Two new species are described below.

Thraulodes daidaleus Thew, new species

Male Imago.—Lengths: body 7.2 mm.; forewing 6.6 mm.; caudal filaments 15.0 mm. *Head:* white, shaded with grey-black about ocelli; vertex white; frontal shell white with median anterior margin lightly suffused with red-brown; face and vestigial mouthparts white, marked with greyish black. Antennal scape yellow-white; pedicel white, shaded with yellow-brown distally; flagellum very light yellow-brown. Turbinate portion of compound eyes light brownish orange, contiguous on meson; lower portion black. *Thorax:* pronotum yellow-white with median and lateral portions of posterior margin black; pleura yellow-white with short oblique black stripe; sternum yellow-white, shaded with red-brown medially. Mesonotum light yellow-brown; antero-lateral margins and posterior median area (not including tip of scutellum) broadly white; sutures finely margined with dark brown; pleura yellow-white with broad brown oblique stripe running from wing base past anterior margin of coxal cavities; areas about coxal cavities and wing base broadly marked with blackish brown; extreme anterior margin of sternum with broad medium brown band; remainder white anteriorly, medium brown posteriorly. Metanotum light brown with lateral margins broadly white and with posterior edge finely margined with black; pleura yellow-white, broadly marked with blackish brown about coxal cavities; sternum light brown. *Wings:* hyaline; longitudinal veins of forewing yellow-hyaline; crossveins hyaline; stigmatic area milk-white. All veins of hindwing hyaline. In both wings, area about humeral brace suffused with dark brown. *Legs:* all legs similar; coxae and trochanters yellowish white, marked with black-

brown; femora yellowish white for basal two-thirds with faint brown band on the outer surface and black dot on inner surface, one-third of distance from base; distal one-third medium brown, proximal edge of which shade into a narrow dark brown band; edges of brown area finely black; tibiae yellowish white with pre-apical brown band and with apex white; tarsi very light brown with joints white. *Abdomen:* tergites of segment 1 white with light brown anterior margin and median and lateral black spots; segments 2–6 transparent white with large postero-median black spot, large lateral black spots with a small black spot lateral to these and another faint black blotch on each antero-lateral margin; median area very lightly suffused with red-brown; median portion of posterior margin of segment 6 light red-brown; segments 7–10 reddish brown with black median streak and lateral black spot. All segments with black stigmatic dots. Sternites of segments 2–7 white with two small black dots on each side of median line and a larger black dot in each postero-lateral corner; sternites 8–10 yellowish white, 8 with postero-lateral dots. *Genitalia:* yellow-white, as in fig. 1. *Caudal filaments:* white with every fourth segment dark brown.

Female Imago.—As in the male, with the following exceptions. Lengths: body 6.3 mm.; forewing 7.5 mm.; caudal filaments 7.5 mm.; abdominal segments 1–6 and proximal half of 7 medium brown; distal half of 7 and all of 8 white; 9–10 light pinkish brown. This pinkish coloration is undoubtedly due to the presence of eggs within the abdomen.

Holotype male: Nova Teutonia, Santa Catarina, Brazil, January 1956 (Fritz Plaumann, collector); preserved in alcohol. Allotype, female: same data, except collected in November 1956; preserved in alcohol. Both types are in the collections of the Illinois Natural History Survey. Paratypes: 2♂♂, same data as for holotype and preserved in alcohol, in my personal collection; 8♂♂, 2♀♀, all pinned, from Nova Teutonia, Brazil, January 3-5, 1956, with 1♂ in the collection of the Illinois Natural History Survey and the remainder in my personal collection. Also, there are 3♂♂ and 3♀♀ subimagoes from the same locality collected in September 1956.

Etymology: from Gr., daidaleos-dappled, spotted.

Thraulodes daidaleus belongs to the *trijunctus* group. The male genitalia will separate it from all other species for which figures of this structure have been published. For the remaining species, the coloration is considerably different.

Thraulodes traverae Thew, new species

Male Imago.—Lengths: body 6.3–7.0 mm.; forewing 7.0–8.0 mm.; caudal filaments 10.0 mm. *Head:* dark brown; face and vestigial mouthparts marked with white. Antennal scape and pedicel dark brown, flagellum missing. Turbinate portion of compound eyes pink, lower portion black. *Thorax:* pronotum yellowish white with median area suffused with medium brown; pleura yellowish white with broad, dark brown oblique stripe running from posterior

corner of pronotum to forecoxal cavities; sternum yellowish white. Mesonotum deep brownish yellow with sutures finely margined in dark brown; pleura deep brownish yellow, except around coxal cavities, where it is white and is marked broadly with black; anterior half of sternum yellowish-white and with broad transverse brown band; posterior half light brown laterally and medium brown medially. Metanotum light yellow-brown with several faint transverse black-brown lines; pleura same as mesopleura; anterior half of sternum light transluscent brown, posterior half medium brown. *Wings:* hyaline; longitudinal veins of forewing light yellow; crossveins hyaline; area about humeral brace suffused with dark brown; stigmatic area milky. Hindwing completely hyaline, except for area around humeral brace, which is suffused with dark brown. *Legs:* all coxae and trochanters yellowish white, marked with black-brown. Fore femur white for basal one-fourth, then next fourth dark brown, followed by a narrow band of white and then a narrow band of dark brown, and apical fourth medium brown; tibia yellowish white with apex dark brown; tarsi yellowish white. Mid and hind femora with basal broad band of white, followed by a narrow band of dark brown and then a narrow band of light brown, next another broad white band, followed by a narrow band of dark brown and a narrow band of medium brown, and with apex white; tibiae and tarsi yellowish white with bases of tibiae suffused with light brown. *Abdomen:* segments 2–6 transparent white, 7–10 light brownish orange; segment 1 light brown. Tergites 1–7 with the following maculation of dark brown: 1) submedian spot on each side of middorsal line, narrowly joined to each other on posterior margin; 2) a large spot lateral and contiguous to these; 3) a large spot in postero-lateral corner; 4) small dark median and faint, small, posterior stigmatic dots. Sternites with median area lightly suffused with very light red-brown and with small dark brown dot in extreme postero-lateral corners. *Genitalia:* as in fig. 2. *Caudal filaments:* white, with every fourth segment black, the following segment black proximally, and with distal joint of this segment narrowly black.

Female Imago.—As in the male, with the following exceptions: lengths, body 6.3 mm.; forewing 6.3 mm.; caudal filaments 9.0 mm.; head suffused with grey dorsally with two submedian black dots between the eyes. Legs similar but fore tibia lacking distal brown band. All veins and crossveins in forewing yellowish hyaline. Abdominal segments 1–6, proximal half of 7, and all of 9–10 light brownish-orange, but with the maculation as in the male.

Holotype male, and allotype female: Nova Teutonia, Santa Catarina, Brazil, January 1956 (Fritz Plaumann, collector); preserved in alcohol. Both types are in the collections of the Illinois Natural History Survey. Paratypes: all with the same data, except for the dates; 1♂, November 1956 preserved in alcohol and in my personal collection; 7♂♂, January 1956 and 1♀ November 1956 preserved in alcohol, two males each in the collections of Dr. Jay R. Traver and Institut Royal des Sciences naturelles de Belgique; 50♀♀, January 1-7, 1956, all pinned, two females each in the collections of Dr. Lewis Berner, Dr.

G. F. Edmunds, Jr., the California Academy of Sciences, and the Illinois Natural History Survey, with the remainder in my personal collection. In addition, there are 9♂♂ and 6♀♀ subimagoes with the same data, but collected in September 1956 and 2♂♂ subimagoes collected in November 1956 which also appear to be of this species, in my personal collection

Etymology: I am pleased to name this species in honor of Dr. Jay R. Traver in recognition of her outstanding work on the Neotropical mayflies and, also, of the constant aid which she has given me in the study of the group.

The markings of the abdomen would place this species close to *T. furficulus* Traver, but *T. traverae* is much smaller and has greatly differing male genitalia and a different maculation pattern on the legs.

Genus Traverella Edmunds

This genus was proposed in 1948 by Edmunds for the two North American species then placed in the genus *Thraulus*, *albertana* (McDunnough) and *presidiana* (Traver), with the former as the type of genus. It was characterized in the adults from the type of *Thraulus*, *T. bellus* Eaton, by the assymetrical forking of vein R_{4+5} in the forewing and by the presence of basal spines on the male forceps plate. Later (1950) Edmunds placed two Neotropical species in the genus—*T. erhardti* (Ulmer) and *T. maculipennis* (Ulmer). Thus the matter rested until Demoulin (1955*c*) noted that all of the remaining American species placed in *Thraulus* also had an assymetrical forking of vein R_{4+5}, but did not possess the basal spines characteristic of *Traverella*. For these species he proposed another genus, *Homothraulus*, with *H. missionensis* (Esben-Peterson) as the type.

In at least two cases, however, it appears that the species assigned to *Homothraulus* should have been placed in *Traverella*. The first is that of the species *roundsi* Traver. The figure of the male genitalia given by Traver (1947) in the original description definitely shows basal spines present on the forceps plate; they are similar in form to those of *T. presidiana* (Traver). Secondly, in the same paper (1947) Traver states that there appeared to be such basal spines in the species *bradleyi* Needham and Murphy, although they were difficult to determine for certain. As the shape of the penis lobes is very much like that of *T. erhardti* (Ulmer) a form not found in *Homothraulus*, it appears likely that *bradleyi*

should also be included in *Traverella*. As a result, I hereby place these two species as *Traverella roundsi* (Traver), (new combination), and *Traverella bradleyi* (Needham and Murphy), (new combination).

In addition, the figure presented by Ulmer (1943) of the male genitalia for *H. montium* (Ulmer) seems to show basal spines. The genitalia are so unusual, however, that I think it is best to leave it in *Homothraulus* until more is known about it.

TRAVERELLA ERHARDTI (Ulmer)

This species hae been known previously only from Hansa, province of Santa Catarina, Brazil. One male and one female, collected from Nova Teutonia, Brazil, January 3 and January 1, 1956, respectively, are present in my collection and appear to be of this species.

GENUS ULMERITUS Traver

The genus *Ulmeritus* was first described by Traver in 1956 for the unusual new species, *U. carbonelli*, from Uruguay. At the same time, she described a variant of this form as *Ulmeritus* sp. and transferred *sao-paulense* Traver from *Atalophlebiodes* to the new group. This action left only two neotropical species in *Atalophlebiodes*. Somewhat earlier, Harker (1954) had shown that the type of *Atalophlebiodes* and the other Australian and New Zealand species were not congeneric with those placed therein from South America. This was noted by Traver (1959), whereupon she transferred *Atalophlebiodes flaveopodes* (Spieth) and *Atalophlebiodes haarupi* (Esben-Peterson) to *Ulmeritus*. At the same time, Traver also described two new species in this genus, *U. uruguayensis* and *U. luteotinctus*, and then separated the known species into three subgenera—*Ulmeritus*, *Pseudulmeritus*, and *Ulmeritoides*.

In my material from Brazil there are specimens of the *Ulmeritus* sp. of Traver, which I am considering to be a distinct and new species, as well as specimen representing two other new species. *Ulmeritus* sp. definitely belongs to the subgenus *Ulmeritus;* the new species *U. adustus* can be placed in *Ulmeritoides* as described by Traver. The other species described below, *U. patagiatus*, is known only in the subimagal form and does not conform well to any of the subgenera as now delimited. The hind wing is similar to those of both *Ulmeritoides* and *Pseudulmeritus*, the male genitalia is of an intermediate type, and the

ratios of the leg segments are not known, of course, for the imagal state. Therefore, I am not placing the species in any subgenus at the present time.

Ulmeritus balteatus Thew, new species

Ulmeritus sp. Traver, 1956. Proc. Ent. Soc. Wash. 58:11.

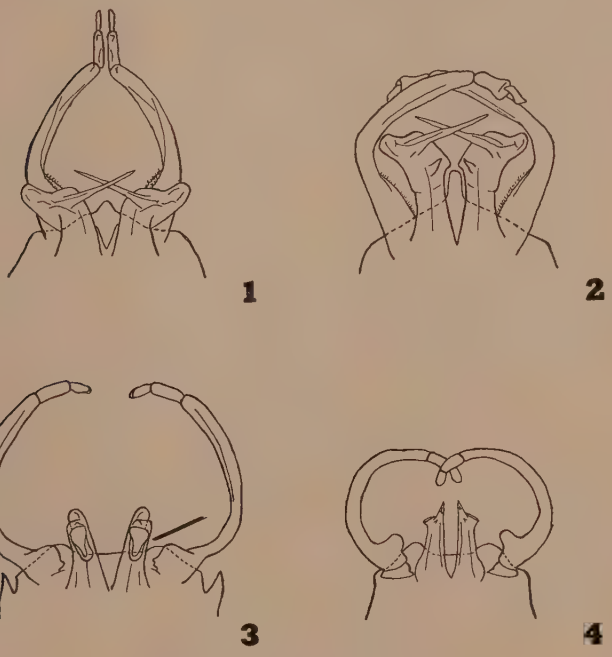
Male Imago.—Lengths: body 10.0 mm.; forewing 10.5 mm.; caudal filaments missing. *Head:* white; frontal shelf, vertex between compound eyes, and lateral margins black. Face white, marked with black; venter white, with vestigial mouthparts black. Antennal scape and pedicel light yellow-brown; flagellum light brown. Turbinate portion of compound eyes peach colored; lower portion blackish grey. *Thorax:* pronotum yellow-white; median area with a narrow black longitudinal line, which forks like a "Y" a short distance before reaching the posterior margin; the "arms"—narrow black lines—join a broad black line which margins the lateral edges; a narrow black longitudinal line in each lateral area; pleura yellow-white, heavily infuscated with black; sternum deep yellow with a transverse black band between fore coxae and with blackish infuscation posteriorly. Mesonotum very deep yellow with median line and other sutures very narrowly black; extreme antero-lateral areas lightly infuscated with grey; pleura light yellow, heavily marked with black; sternum deep yellow with median line broadly black and with basisternum and lateral edges brownish. Metanotum deep yellow with a few narrow transverse streaks; pleura as for mesothorax; sternum yellow-brown. *Wings:* forewing hyaline, except for costal and subcostal interspaces and basal three-quarters of membrane posterior of Cu_1, which are brown; crossveins dark brown with membrane surrounding each stained with dark brown; longitudinal veins yellow-brown. Hindwing light brown, fading to almost hyaline posteriorly; longitudinal veins brownish-hyaline; crossveins dark brown, each surrounded by a dark brown spot as in the forewing. *Legs:* fore coxae and trouchanters deep yellow, marked with dark brown; fore femur deep yellow, with apex shaded with dark brown; tibia medium brown, somewhat lighter proximally, and with apex yellow; tarsi medium brown, with joints narrowly ringed with yellow. Mid and hind legs similar, except tibiae and tarsi light yellow and tarsal joints narrowly ringed with brown. *Abdomen:* medium brown; tergites with pale median stripe, bordered on each side by a very narrow dark brown stripe; large pale spot antero-laterally and the lateral ganglionic area suffused with dark brown; each segment with narrow dark brown transverse band on posterior margin. Sternites light yellow-brown, with dark brown median spot on the anterior margin, which has a very narrow dark brown stripe running to middle of segment from each side; posterior margins shaded with medium brown. *Genitalia:* forceps light yellow-brown, becoming darker distally; penis lobes yellow-white, as in fig. 3. Caudal filaments missing.

Female Imago.—There seem to be no major differences between the females of this species in my collection and the description of this sex as presented by Traver (1956).

Holotype male: Nova Teutonia, Santa Catarina, Brazil,

February 1957 (Fritz Plaumann, collector); preserved in alcohol. Allotype, female: same data as for holotype, except collected on January 6, 1956; pinned. Both types are in collections of the Illinois Natural History Survey. Paratypes: all with the same data as for holotype, except for dates; 1♂, February 1957, and 1♂, September 1956, both in alcohol and in my personal collection; 1♀, January 4, 1956, pinned, and in my personal collection. In addition, there are many subimagoes of both sexes collected at the same locality in January, September, and November of 1956 and in February of 1957 in the collections of Dr. Lewis Berner, the California Academy of Sciences, Dr. G. F. Edmunds, Jr., Institut Royal des Sciences naturelles de Belgique, Dr. Jay R. Traver, and the author.

Etymology: from L., balteus-belt or band.



EXPLANATION OF FIGURES

Figs. 1–4, male genitalia. 1. *Thraulodes daidaleus* Thew; 2. *Thraulodes traverae* Thew; 3. *Ulmeritus balteatus* Thew; 4. *Ulmeritus adustus* Thew.

Variation in the male paratypes: there seem to be no striking differences between the male paratype collected at the same time as the holotype. For the other one, the following differences were noted: fore femora shaded with dark brown on the inner surface: infuscation of the basal region of the forewing and also that of the hindwing somewhat lighter in color and less extensive.

In the genus *Ulmeritus* as here considered, *U. balteatus* is closely related to *U. carbonelli* Traver, the type of the genus. Traver (1956) had specimens of this species which she referred to as *Ulmeritus* sp.; she placed no name on them, for she had no imaginal males in her collection and so could not determine if there were genitalic differences; she also questioned whether the coloration differences were taxonomic or ecological. The specimens described here not only show small, yet definite differences in the male genitalia in comparison with *U. carbonelli*, but also possess the same color characters, *i.e.* the heavy bands of dark spots across the middle and base of the forewing as did Traver's specimens. As Nova Teutonia is about 450 miles from the Santa Lucia River, Arequita, Lavealleja Province, Uruguay, the locality from which her specimens came, I conclude that these differences are taxonomic and not ecological and that both series represent the same new species.

Ulmeritus adustus Thew, new species

Male Imago.—Lengths: body 5.4 mm.; forewing 5.9 mm.; caudal filaments broken. *Head:* yellow-white; vertex between compound eyes with two dark brown spots and with posterior margin dark brown; median area around ocelli shaded with dark brown; face and vestigial mouthparts yellow-white, marked with brown. Antennal scape and pedicel yellow, flagellum white. Ocelli normal. Turbinate portion of compound eyes light orange in preserved specimens, lower portion black. *Thorax:* pronotum light yellow-brown; lateral margins shaded with black; median line with narrow black longitudinal line, which is intersected near the posterior margin by a similar short transverse stripe, with a lateral black longitudinal stripe on each side; anterior margin black-brown; pleura yellowish white, marked with blackish brown, which blends into medium brown basisternum. Mesonotum deep medium brown, with sutures finely marked with black; antero-lateral margins and tip of scutellum broadly margined with brown; pleura similar, but with yellow-white areas about wing base and coxae; sternum deep medium red-brown, except around coxae, where it is light brown. Metanotum medium brown, with posterior finely margined in black; pleura deep medium brown, with sutures marked with black; sternum light brown. *Wings:* hyaline; longitudinal veins of forewing light yellow-brown anteriorly, whitish hyaline posteriorly; crossveins hyaline; extreme wing bases lightly suffused with brown;

stigmatic area milky. Hindwing with extreme basal subcostal space suffused with brown; veins hyaline, as in fig. 4. *Legs:* all coxae and trochanters yellowish white, marked with brown. Fore femora light yellow-brown, with preapical and apical dark brown bands; tibiae dark brown, with broad median and narrow apical bands of pure white; tarsi yellowish white, with joints pure white. Mid-femora yellowish white with faint basal and median and dark apical bands of brown; tibiae white with brown apical band; tarsi white, except for distal segment, which is light brown. Hind femur yellow-white with basal, median and apical bands of dark brown; tibiae pure yellowish white; tarsi as in midleg. *Abdomen:* tergites dark brown; posterior margins of segments 1–9 yellow-white, all segments with anterior margin yellow-white in median area; segments 1–2 with two submedian light brown dots, these fusing on segments 3–10 to form mesal, yellowish white triangles, which are gradually larger posteriorly; all segments with large lateral light spot on each side and possessing black stigmatic dots; segments 1–8 with yellow spot in antero-lateral area, which is attached by a narrow yellow oblique stripe to the lateral spot. Sternites light yellow, with segments 1–4 shaded with very light brown, except for median light spot; segments 9–10 shaded with light brown medially; segments 7–8 with lateral brown dot on each postero-lateral corner; all segments with posterior margins shaded with light brown and with dark brown lateral ganglionic marks. *Genitalia:* forceps yellowish white penis lobes yellow-brown, as in fig. 5. *Caudal filaments:* white, with joints very finely marked with brown.

Female Imago.—As in the male, with the following exceptions: lengths, body 6.0 mm.; forewing 6.8 mm.; caudal filaments 6.3 mm. Head yellow, with anterior and posterior margins broadly black and with black median spot, which has narrow oblique black lines proceeding anteriorly. Mesonotum yellow. Abdominal color lighter; second lateral spots not so distinct. Wing membrane without brown suffusions.

Holotype male, and allotype, female: NOVA TEUTONIA, SANTA CATARINA, BRAZIL, February 1957 (Fritz Plaumann, collector); preserved in alcohol. Both in the collections of the Illinois Natural History Survey. Paratypes: same data as for holotype; 44♂♂ and 61♀♀; preserved in alcohol; two of each sex in the collections of Dr. Lewis Berner, the California Academy of Sciences, Dr. G. F. Edmunds, Jr., Institut Royal des Sciences naturelles de Belgique, and Dr. Jay R. Traver; the remainder are in my personal collection; 6♂♂ and 1♀, same data as for holotype, but collected in January 1956, and 5♂♂ and 2♀♀, same as for holotype, except collected in September 1956; all in alcohol and in my personal collection. Also, there are many male and female subimagoes, which have the wing membrane and the veins black, collected in February 1957 and in my personal collection.

Etymology: from L., adustus-tanned, brown, swarthy.

This species is very closely allied to *U. uruguayensis* Traver.

The male genitalia of the two are very similar, except that the penis lobes of *adustus* bear two small spines which are lacking in *uruguayensis*. In addition, the coloration, especially of the legs and abdomen, but also in many lesser details, is definitive for each of the species. Thus, I feel that they are distinct, but closely related species.

Ulmeritus patagiatus Thew, new species

Male Subimago.—Lengths: body 10.7 mm.; forewing 10.9 mm.; caudal filaments 7.0 mm. *Head:* yellow-white; black-brown spot on vertex between the compound eyes; face and vestigial mouthparts white, marked with black-brown. Antennal scape yellow-brown; pedicel white for proximal one-fourth, remainder yellow-brown; flagellum yellow-brown. Turbinate portion of compound eyes light tanish pink, lower portion black. *Thorax:* pronotum yellowish white, with oblique black-brown stripe on each side of median line, leading from postero-lateral corners to median line; lateral margins broadly brown-black; pleura and venter light brown, with sutures broadly marked with yellowish white. Mesonotum light yellow-brown, except for anterior region, which is light yellow; median line and oblique antero-lateral sutures white; pleura brown, marked with yellow-white; sternum medium brown. Metanotum light yellow; pleura and sternum as for mesothorax. *Wings:* translucent (would be hyaline in imago); forewings with veins C, Sc, and R yellow; all remaining longitudinal veins and crossveins whitish hyaline; all veins narrowly margined on all sides with brown. Hindwing with all veins whitish hyaline, except in basal radial area, which is brown. *Legs:* all coxae and trochanters yellow, heavily marked with brown; fore femora yellow with dark brown band one-third distance from apex and with apex brown; edges distally shaded with brown; heavy brown longitudinal stripe on outer margin for basal two-thirds; tibia dark brown with extreme base and median area light and with apex white; first tarsal segment white; remainder grey proximally, white distally. Mid femur yellow with apex brown and with median brown spot on outer margin; tibia and tarsi yellow-white, faintly shaded with light brown. Hind femur yellow, with median and apical brown bands and with proximal half heavily shaded with dark brown on both sides; tibia and tarsi as for midlegs. *Abdomen:* tergites light brown, with following yellow markings: 1) a median stripe, gradually increasing in width posteriorly; 2) immediately lateral to this, a large spot on the anterior margin on each side (distinction between stripe and spots obliterated on segment 1); 3) a lateral spot; 4) a spot in the antero-lateral corner; 5) a median spot in the stigmatic area. Sternites light brown with median line and extreme lateral areas yellow. All segments narrowly margined with black posteriorly. *Genitalia:* yellow-white, as in fig. 6. *Caudal filaments:* white, with joints ringed with dark brown, which is darker on every other segment.

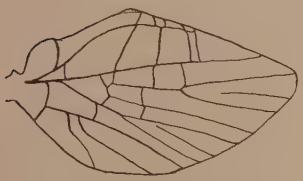
Female Subimago.—As in the male, with the following exceptions: length of body 11.0 mm.; forewing 11.4 mm.; caudal filaments missing. Coloration in general lighter than in male; maculation of abdominal tergites somewhat diffuse; sternites with posterior margin yellow, extending foreward about

half the length of the segment medially and with antero-lateral yellow spots.

Holotype subimagal male, and allotype, subimagal female: NOVA TEUTONIA, SANTA CATARINA, BRAZIL, September 1956 (Fritz Plaumann, collector); preserved in alcohol. Both types are in the collection of the Illinois Natural History Survey. Paratypes: same data, except for dates; 2♂♂, September 1956, and 1♀, February 1957; all are subimagoes, preserved in alcohol, and in my personal collection.

Etymology: from L., patagiatus-bordered.

Ulmeritus patagiatus is closely related to *U. adustus* Thew, *U. flaveopodes* (Spieth), and *U. uruguayensis* Traver. The brown bordering of the veins of the wings, the maculation of the legs and abdomen, and the forms of the penis lobes make it easily separable from them, however.



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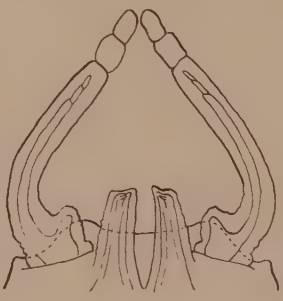

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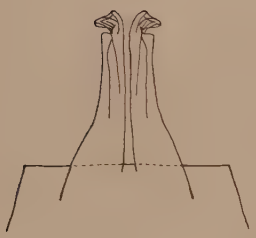

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EXPLANATION OF FIGURES

Fig. 5. *Ulmeritus adustus* Thew, hind wing; fig. 6. *Ulmeritus patagiatus* Thew, male genitalia of subimago; fig. 7. *Atalophlebia sepia* Thew, penis lobes.

Genus Deleatidium Eaton

Deleatidium vittatum Thew, new species

Female Imago.—Lengths: body 8.1 mm.; forewing 10.3 mm.; caudal filaments 11.0 mm. *Head:* yellow-white; vertex between compound eyes with broad transverse black-brown band; black stripes between lateral and median ocelli and beneath antennae; vestigial mouthparts broadly marked with black-brown. Antennal scape yellow-white, pedicel yellow-brown, flagellum missing. Compound eyes black. *Thorax:* pronotum yellow-white, with fine median longitudinal black line and two broad black oblique stripes; lateral margins and extreme median posterior margin broadly black; pleura yellow-white, shading into deep brown ventrally; sternum brown, except for extreme median area, which is yellow. Mesonotum light yellow with sutures faintly black; tip of scutellum white; pleura yellow-white, broadly marked with medium brown; sternum light yellow-brown laterally, darker medially. Metanotum yellow with broad dusky transverse bands in lateral areas and with lateral margins finely black; sternum and pleura same as for mesothorax. *Wings:* forewing hyaline, with costal and subcostal spaces infuscated with light red-brown. Veins C, Sc, and R light brown, other yellowish hyaline. Crossveins brown in the anterior region, fading to yellowish hyaline posteriorly. Hindwings hyaline, with veins slightly yellowish and with basal one-third of radius brown. *Legs:* all legs similar; femora light yellow, with faint brownish shading, which is concentrated into median and apical bands; tibiae and tarsi yellowish white, the latter lightly shaded with brown distally. *Abdomen:* yellow-white; tergites with posterior edges and lateral areas broadly infuscated with light brown; segments 1–4 with this shading continued medially on the anterior margin. All segments with black stigmatic dots. Sternites light yellow, with posterior margins broadly brown and anterior margins lightly infuscated with light brown. *Caudal filaments:* yellow-white, with joints brown.

Holotype female: Nova Teutonia, Santa Catarina, Brazil. November 1956 (Fritz Plaumann, collector); preserved in alcohol; in the collections of the Illinois Natural History Survey. Paratype: 1♀, same data as for holotype; preserved in alcohol and in my personal collection.

Etymology: from L., vittatus-decorated or bound with a ribbon.

The genus *Deleatidium* Eaton is known from Australia, New Zealand, and South America; from this latter region seven species have been described, all of which are from the Andean mountain country. None possess the exact abdominal color pattern nor the thin brown ribbon on the anterior edges of the forewing, which are characteristic of *D. vittatum* Thew.

Genus Atalophlebia Eaton

Atalophlebia sepia Thew, new species

Male Imago.—Lengths: body 10.0 mm.; forewing 12.0 mm.; caudal fila-

ments 19.0 mm. *Head:* blackish brown; face and vestigial mouthparts deep yellow, sparsely marked with black-brown. Antennal scape and pedicel deep brown, marked with black; flagellum yellow-brown. Compound eyes dark red-brown dorsally, changing to blackish ventrally. Ocelli deep yellow, ringed with black at base. *Thorax:* pronotum yellow-white, mottled with brown; median line very finely black; median posterior margin black; mid-way between median line and lateral edge there is a thick longitudinal black stripe; at the base of this commences a thick oblique black stripe; lateral margins bordered with black; dorsal half of pleura black, ventral half yellowish white; sternum yellow-brown. Mesonotum medium yellow-brown, with sutures finely black and with tip of scutellum black; pleura yellow, marked with brown, and with longitudinal stripe of white next to the antero-lateral margin of the notum; sternum yellow-brown. Anterior half of meta-notum yellow-brown, posterior half yellow-white; median area suffused with black and posterior edge finely margined with black; pleura and sternum as for mesothorax. *Wings:* hyaline; veins yellow-hyaline; extreme basal areas of C, Sc, and R interspaces of forewing infuscated with yellow-brown. Hindwing hyaline, except for extreme base anteriorly, which is shaded with brown; veins yellowish hyaline. *Legs:* all legs similar; coxae yellow, marked with blackish brown; trochanters yellow-white; femora yellow-brown, with median black-brown band and with apex dark brown; tibiae yellow-brown with apex dark brown; tarsi light yellow. *Abdomen:* tergites translucent white with the following black-brown markings on segments 1–7: 1) a median light stripe, finely bordered on each side with black (weak on segments 4–5); 2) immediately lateral to this, a thick longitudinal stripe, which angles away from the median line slightly at the anterior edge of the segment; 3) a wide band on posterior margin; 4) a large lateral spot, connected to the oblique stripe and the posterior band by thin dark suffused areas; 5) stigmatic dots. These markings reduced on segments 4–5, heavy on segments 6–7. Segment 8 yellow with thick black longitudinal stripes anteriorly on each side of median line, with a black oblique stripe on the lateral margin, and with a black stigmatic dot. Segment 9 similar but with stripes running the entire length of the segment and with the markings heavier. Segment 10 yellow, with median line and lateral edges black. Sternites yellow-brown with anterior margin hyaline and with anterior median area dark brown; segment 8 with pair of dark brown dots. *Genitalia:* yellow-brown, as in fig. 7. *Caudal filaments:* white, with every other joint widely banded with brown and the remainder only finely margined with brown.

Holotype male: FRUTILLAR, CHILE (province not known), February 15, 1950 (J. Herreci, collector); pinned in the collections of the Illinois Natural History Survey. Parataypes: 7♂♂, same data as for holotype; all pinned; six in the collections of the Illinois Natural History Survey, one in my personal collection.

Etymology: from L. sepia-cuttlefish, squid; ink; perverted to mean the rich brown color of such ink.

Outside of the seven unrecognizable species described by L.

Navas, there are four others from the neotropical region placed in this genus; they have been thoroughly reviewed by Demoulin (1955*a* and 1955*b*). The abdominal markings of *Atalophlebia sepia* Thew are very similar to those of *A. chilensis* Eaton, only the sternites presenting basic differences. Other specific characteristics are as follows: the penis lobes of each species are distinctive; in *sepia* the crossveins of the C and Sc interspaces are thickened as in *chilensis*, but, unlike this species, the remaining crossveins show no thickening or infuscation into the wing membrane; the crossveins of the C interspace in *sepia* number 18, with a space immediately distal to the triad R_{2+3} completely devoid of such veins, while *chilensis* has 22 crossveins in this space, evenly placed along the entire length; and last, the second joint of the fore tarsi of *sepia* is two-thirds of the third joint, while that of *chilensis* is six-sevenths of the third.

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A NOTE ON THE SYSTEMATIC POSITION OF THE GIANT LYCAENID BUTTERFLY LIPHYRA BRASSOLIS WESTWOOD

(Lepidoptera: Papilionoidea)

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The Indo-Australian butterfly *Liphyra brassolis* Westwood is one of the most unusual members of the family Lycaenidae. It is the largest member of the family (the length of the forewing in the male specimen examined was 36.9 mm.) and it has rather unusual habits. The larva lives in the nest of the green tree ant *Oecophylla smaragdina* (Fabricius) and preys upon the brood. It is protected from the ants by a smooth, very heavily sclerotized cuticle. The pupa is formed within the last larval skin, which continues to serve as a protective shield. The newly emerged adult is covered with loose scales which are torn off by attacking ants, diverting them long enough to permit the butterfly to escape.

At the time of his study of the higher classification of the butterflies, the author was unable to obtain a specimen of this unusual species for study. Since then a number of people have expressed the opinion that such a large and unusual lycaenid might not show the skeletal structure typical of the other members of the family. Recently, through the courtesy of Mr. J. Sedlacek of the California Academy of Sciences, a single damaged male specimen of this species has been obtained for dissection. It was found to possess the following characters (numbers refer to the characters enumerated in the diagnosis of the family Lycaenidae in Ehrlich, 1958, pp. 356-357; "Clench" indicates characters missing on the specimen studied, but described in Clench, 1955.): 1) eyes emarginate; 2) eyes bare; 3) face flat; 4) laterofacial sutures nearly contiguous with eye margins; 5) paraocular areas extremely narrow; 6) antennae close together; 7) anterior tentorial pits very low on face; 8) proboscidial fossa deep; 9) labial palps shorter than thorax; 10) labial sclerite well sclerotized around the palpal sockets; 11) anterior tentorial arms slightly crested; 12) antennae not carinate; 13) cervical sclerites not united beneath neck; 14) dorsal plate of pronotum broad; 15) ? (spinasternum destroyed); 16) profurcal arms simple; 17) intercoxal lamella prominent; 18) lateral plates of pronotum fused dorsally to form a V-shaped structure; 19) patagia membranous (apparently — area partially destroyed);

20) ? (area of parapatagia destroyed); 21) presternum present; 22) adnotale not sagittate; 23) lamella of mesodiscrimen curves down to base of furca; 24) processes of second phragma fairly prominent; 25) precoxal suture present, nearly complete; 26) pre-episternum of same magnitude as katepisternum; 27) mesothoracic anepisternum not present as a sparate sclerite; 28) prescutum vertical; 29) meral suture and lamella absent; 30) third phragma consisting of simple stalks; 31) metatergum not completely overhung by mesotergum; 32) caudal part of metathoracic epimeron thin; 33) prespiracular bar fully developed; 34) postspiracular bar reduced; 35) cubitus of forewing apparently trifid; 36) 3V present, weak, fusing with 2V; 37) hind wing with two vannal veins; 38) prothoracic legs bearing claws (Clench); 39) protibial epiphyses absent (Clench); 40) tarsal claws simple; 41) aroliar pad well-developed; 42) pupa in skin of last larval instar; 43) larva without osmateria.

As can be seen from the foregoing, *Liphyra* conforms well to the diagnosis given for the family Lycaenidae. The only notable difference is in character no. 11; the tentorial arms are enlarged to approximately the degree seen in the papilionid genus *Cressida* (Ehrlich, 1958, fig. 21). Although it was not possible to determine the condition of the spinasternum (character no. 15), it seems safe to assume that it is not laterally produced since this structure is simple in all of the butterflies except the Papilionidae and the Pieridae. Similarly the parapatagia (character no. 20) are membranous in all of the butterflies except for a small group of the Nymphalidae. It therefore seems unlikely that they would be sclerotized in *Liphyra*.

Within the family Lycaenidae *Liphyra* appears to fit into the typical subfamily, Lycaeninae. It shows none of the characters (e.g. spinelike projection of the male prothoracic coxae below the articulation of the trochanter, distinct mesothoracic anepisternum, development of humeral and/or marginal veins in hind wing) usually associated with the other major subfamily, the Riodininae. It would seem, therefore, that at least on the basis of the adult morphology there is no reason to place *Liphyra* in a distinct family or subfamily, as has been done by various authors.

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TWO NEW SPECIES OF TYPHLODROMUS FROM CALIFORNIA

(Acarina: Phytoseiidae)[1]

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While on a recent visit to California I collected Phytoseiidae in the area around Riverside and San Bernardino and also examined several excellent collections of these predacious, plant-inhabiting mites. Two hitherto unknown species were recognized, and descriptions and figures of these are given herein with specific diagnoses and an indication of their places in the keys to the family recently prepared by Chant (1960). Both species are of the subgenus *Amblyseius* as recently defined (Chant, 1957).

Typhlodromus (Amblyseius) newelli Chant, new species

(Figs. 1–3)

Female.—Length 420 μ; width 290 μ. *Dorsal shield* smooth, with 17 pairs of setae, of which nine are in the lateral row, two in the median, and six in the dorsal (Fig. 1). All dorsal (D) setae minute except D_1. Seta M_1 minute; M_2 longer, equal to L_6. Seta L_1 longer than D_1, L_2, or L_3. Setae L_2 and L_3 equal. Seta L_6 minute, much shorter than L_6. Seta L_9 the longest on the shield. Setae S_1 and S_2 on interscutal membrane. *Sternal shield* with only two pairs of setae. Two pairs of small metasternal plates, each with a seta. *Genital shield* normal, with a pair of setae. *Peritremal plates* broad, extending posteriorly around bases of coxae IV and anteriorly to the level of setae D_1. *Metapodal plates*, two pairs, one minute. *Ventrianal shield* (Fig. 2; 140 μ long, 115 μ wide) approximately rectangular with posterior margin rounded and lateral margins concave, and three pairs of preanal setae, a pair of pores, and a crease around anal opening. Four pairs of setae surrounding ventrianal shield; one (VL_1) long, curved. *Gnathosoma* and *maxillary palps* normal for the genus. Fixed digit of chelicera multidentate. *Coxae* all slightly reticulated. *Leg IV* with three macrosetae (Fig. 3), genu, tarsus, and basitarsus.

Male.—Unknown.

Diagnosis.—The relative lengths of setae L_2 and L_3 and of L_5

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and L_6 make this species distinct. Differences from similar species are: from *T. (A.) neomexicanus* Chant (1960) by L_2 being equal to L_3; from *T. (A.) lichenis* Chant (1960) by L_1, L_9, and M_2 being longer and by having D_5; from *T. (A.) graminis* (Chant) by many setae being longer, by having only two pairs of setae on the sternal shield, and by the shape of the ventrianal shield; from *T. (A.) septa* (Garman) by L_5 being much shorter and by having D_5; and from *T. (A.) exopodalis* Kennett by having only two pairs of setae on the sternal shield, by having D_5, and by L_6 being longer. In my keys this species comes to *T. (A.) graminis*.

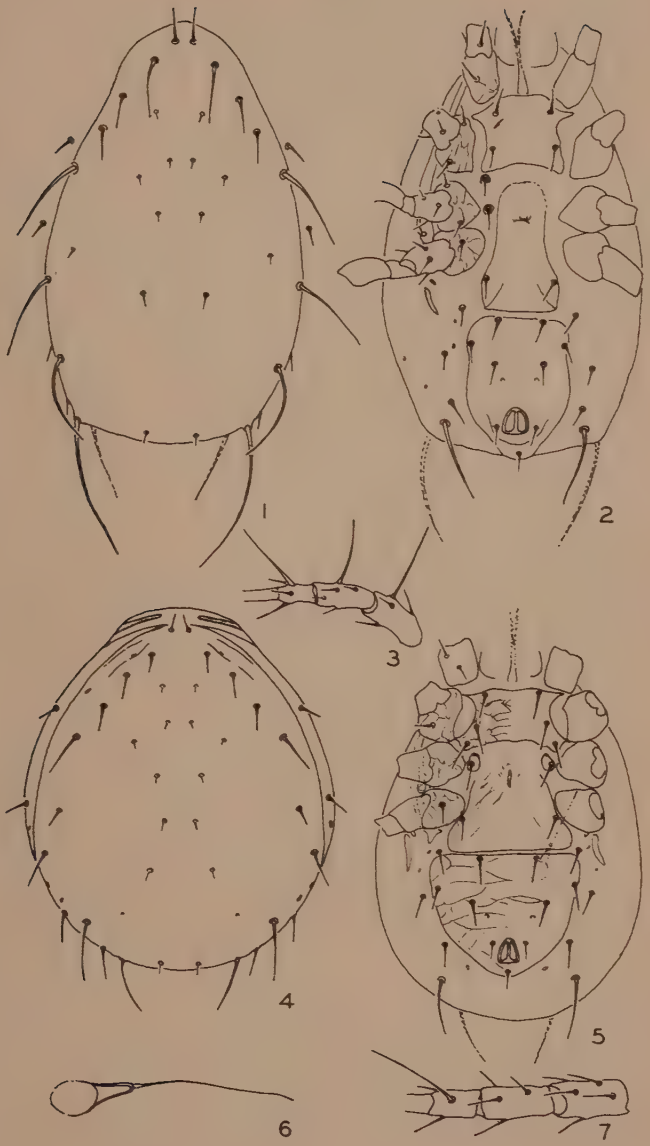
Holotype female (Canadian National Collection No. 6802) and nine other females were collected from litter "below edge of cliff" at PALOS VERDES ESTATES, LOS ANGELES COUNTY, CALIFORNIA, in June, 1956, by Dr. I. M. Newell, in whose honor the species is named. Two additional females were collected by Dr. Newell from the type locality in December, 1955, and March, 1956. One specimen was collected from magnolia 10 miles south of Santa Rosa, Sonoma County, California, in April, 1957, by Mr. R. O. Schuster, and a further specimen from buckeye on the University of California campus, Berkeley, in March, 1953, by Mr. N. Walker.

Typhlodromus (Amblyseius) palustris Chant, new species
(Figs. 4–7)

Female.—Length 400 μ; width 285 μ. Body globular. *Dorsal shield* smooth, with 18 pairs of setae, of which nine are in the lateral row, two in the median, and seven in the dorsal (Fig. 4). All setae short; dorsal (D) ones minute. Setae L_2 and L_3 equal, longer than L_1. Seta L_5 shorter than L_6. Setae L_9 and M_2 approximately equal. A distinct pore mesad of M_2. Four heavily sclerotized spots: near setae L_1, L_3, L_6, and L_7. Setae S_1 and S_2 on interscutal membrane. *Sternal shield* reticulated and with three pairs of setae. *Metasternal plates*, one pair, each with a seta. *Genital shield* slightly reticulated, very broad, with a pair of setae. *Peritremal plates* very broad, with posterior end truncate and lying close to coxa IV and anterior end extending to level of seta D_1 (Fig. 4). *Metapodal plates*, four pairs, three minute. *Coxal gland* (Fig. 6) unique with unusually long duct leading from coxa IV to trumpet-shaped distal portion. *Ventrianal shield* (Fig. 5; 140 μ long, 180 μ wide) reticulated, triangular, with lateral margins convex and posterior margin rounded, three pairs of preanal setae, and a pair of pores.

EXPLANATION OF FIGURES

Figs. 1–3, *Typhlodromus (Amblyseius) newelli* Chant. 1, Dorsal shield; 2, ventral surface; 3, leg IV. Figs. 4–7. *T. (A.) palustris* Chant. 4, Dorsal shield; 5, ventral surface; 6, coxal gland; 7, leg IV.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A small plate lying just behind ventrianal shield. Four pairs of setae surrounding ventrianal shield, one (VL_3) moderately long. *Gnathosoma* and *maxillary palps* normal for the genus. Fixed digit of chelicera multidentate. *Coxae* all heavily reticulated. *Leg IV* (Fig. 7) with macroseta on basitarsus.

Male.—Unknown.

Diagnosis.—The presence of seta D_7 makes this species unique among the Phytoseiidae. In some specimens a small seta occurs between the two D_7's but this is probably an aberration. *T. (A.) palustris* keys to *T. (A.) novaescotiae* Chant (1960) and it can be separated from this species as follows: in *T. (A.) palustris* seta L_6 is longer than L_5, D_7 is present, D setae are minute, and the anterior edge of the ventrianal shield is straight and meets the lateral margins acutely; in *T. (A.) novaescotiae*, setae L_5 and L_6 are approximately equal, D_7 is absent, D setae are short but not minute, and the anterior margin of the ventrianal shield is rounded.

Holotype female (C.N.C. No. 6803) and another female were collected at Balch Camp, Fresno County, California, in August, 1956, by Mr. R. O. Schuster. Other records are: one female collected from *Microtus montanus*, Cottonwood Basin, White Mountains, Mono County, California, June, 1954, by Dr. D. Furman; two females collected on marshy ground, Garner Valley, San Jacinto Mountains, California, June, 1956, by Dr. I. M. Newell; one female collected on ladino clover at Ferris Ranch, two miles east of Orland, Glenn County, California, August, 1953, by Dr. A. E. Pritchard.

Acknowledgments

I am grateful to the following for permission to examine and describe material from their collections: Dr. I. M. Newell, University of California, Riverside; Mr. E. A. McGregor, Whittier, California; Dr. A. E. Pritchard and Dr. D. P. Furman, University of California, Berkeley; and Mr. R. O. Schuster, University of California, Davis. I am also grateful to the Pinellas Biological Laboratory Inc. for the travel grant that was provided.

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A NEW SUBTERRANEAN RHIZOECUS MEALYBUG FROM ARIZONA

(Homoptera: Pseudococcidae)

HOWARD L. McKENZIE
University of California, Davis

Each summer the University of California conducts a required undergraduate course in Entomology (Entomology 49), which deals primarily with the collection, identification and preservation of miscellaneous insects. During the summer of 1958 this course was held at the Southwestern Research Station of the American Museum of Natural History, which is approximately six miles northwest of Portal in southern Arizona. At that time Dr. Richard M. Bohart, Vice-Chairman of the Department of Entomology and Parasitology of the University of California, was in charge of the course. Among insect collections made by Dr. Bohart was a soil sample collected five miles southeast of Apache, in Cochise County, Arizona. The collected soil was processed in a Berlese insect trap and, among other arthropods, a single adult female hypogeic mealybug was recovered.

Due to the effort made by Dr. Bohart in procuring the mealybug, the author takes great pleasure in dedicating the species in his honor.

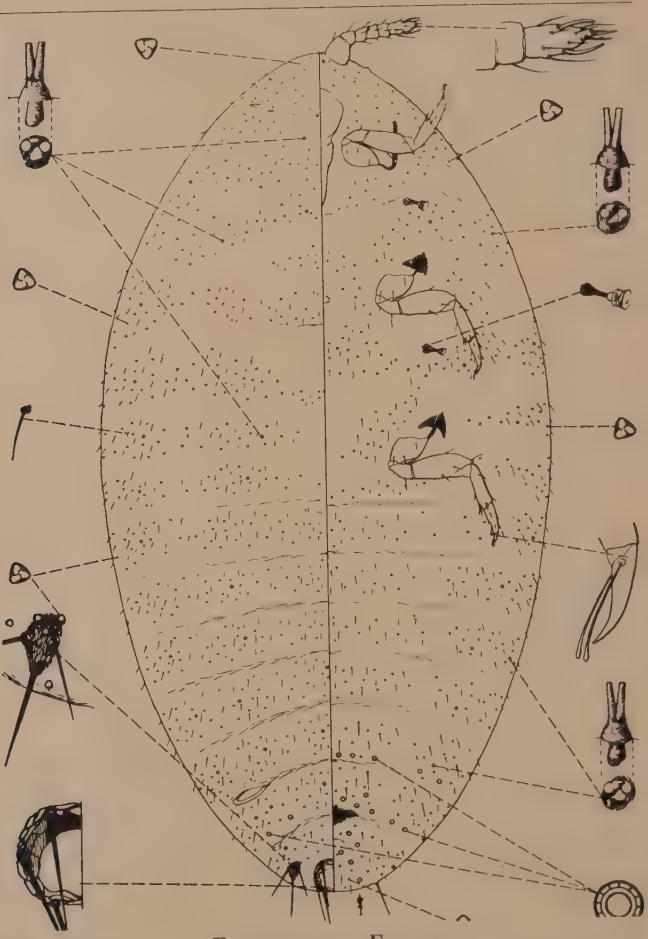
Rhizoecus boharti McKenzie, new species

(fig. 1)

Recognition characters—Adult female.—elliptical, broadened across the middle. Length approximately 1.20 mm. Cerarii entirely lacking on dorsum; anal lobes with several slender setae set in a quite distinct, but small, area of sclerotization. Bitubular pores rather small and inconspicuous, little larger than a trilocular pore, seemingly formed of a sclerotized cone from the apex of which arise two sclerotized tubes; these pores totalling as many as 54 for the entire dorsum. Dorsum moderately beset with trilocular pores and small body setae. Oral collar ducts lacking. Dorsal multilocular disk pores present in few numbers along posterior border of eighth abdominal segment. Anal ring borne at apex of abdomen, its six setae slightly longer than greatest diameter of ring, its pores large, oval and irregularly shaped, some appearing clear and open, others with varying amounts of pigmentation. Dorsal ostioles well-developed.

Ventrally, multilocular disk pores present from tip end of abdomen to posterior margin of seventh segment. Bitubular pores few, apparently confined to a series along body margin, extending from posterior abdomen to head region, apparently the same size as those of dorsum. Trilocular pores generally distributed on venter, but showing rather marked "clear areas" submarginally on abdomen and in thoracic region. Ventral oral collar ducts lacking. Setae on venter short and slender.

Circulus lacking. Eyes present. Antennae six-segmented, quite short and stout, apical segment bearing four sensory setae; placed close together near apex of head, interantennal space equal to slightly less than width of first antennal segment at its base. Legs comparatively stout, tibia and tarsi armed with stout spines. Tarsal claws with digitules exceeding apex of claw and very slightly knobbed.



EXPANATION OF FIGURE

Fig. 1. *Rhizoecus boharti* McKenzie, new species, collected in soil, 5 miles southeast of Apache, Cochise County, Arizona.

Holotype adult female, collected in soil, FIVE MILES SOUTHEAST OF APACHE, COCHISE COUNTY, ARIZONA, August 11, 1958, by R. M. Bohart, deposited in the University of California, Department of Entomology and Parasitology Museum Collection at Davis, California. Unfortunately, this lot represents the only known collection of the mealybug.

Using Ferris' key to North American species of *Rhizoecus* as presented in his 1953 Atlas of the Scale Insects of North America, Volume VI, page 427, this species runs to couplet 12 (11) including *Rhizoecus associatus* (Hambleton) and *R. distinctus* (Hambleton). However, it is quite different from these two species in possessing bitubular instead of tritubular pores, and lacking dorsal and ventral multilocular disk pores in the thoracic region.

It is related to *Rhizoecus kondonis* Kuwana, in the possession of bitubular pores, but differs from that species in lacking a circulus, possessing digitules which extend beyond apex of claw, and by the presence of a few multilocular disk pores along posterior margin of eighth abdominal segment.

Habits.—No information other than that the mealybug occurs in the ground where it presumably feeds on plant roots.

Suggested common name.—Bohart Rhizoecus mealybug.

The accompanying illustration was made, under the author's supervision, by Mrs. Julia Z. Iltis.

BOOK REVIEW

THE BEETLES OF THE PACIFIC NORTHWEST. PART II: STAPHYLINIFORMIA, by Melville H. Hatch, with the collaboration of Milton W. Sanderson and Gordon Marsh. University of Washington Publications in Biology, Vol. 16, pp. xii + 384, bound, offset. Published December 27, 1957. Price $7.00, from the University of Washington Press, Seattle 5.

Volume I of this important series was reviewed in this journal in 1956. Volume II covers the families Silphidae, Leptinidae, Leiodidae, Staphylinidae, Scydmaenidae, Scaphidiidae, Clambidae, Corylophidae and Ptiliidae, in that sequence. The subfamily Steninae of the Staphylinidae, with three new species, is treated by Dr. Sanderson, the family Scydmaenidae, with eight new species, by Mr. Marsh. The genus *Brathinus* is included in the tribe Anthereophagini of the staphylinid subfamily Omaliinae. Pages 302–375 comprise 37 plates with their explanations; page *ii* is a frontispiece, figuring *Nicrophorus investigator* (Zetterstedt) by Daniel Bonnell.

This book is exceedingly helpful for anyone working over material from

the region covered, and its environs. Indeed it is essential, as the following data show. In the small silphoids (Leiodidae) Dr. Hatch has described 33 new species and renamed one; in the Staphylinidae he has proposed seven generic names and has described the following as new: two subgenera, 159 species, two subspecies, three aberrations; in the Ptiliidae, two new species. There are many new synonymies throughout the text.

A majority of the new Staphylinidae are small forms, and the total is hardly surprising, for they have been virtually untouched since Casey's day and never before worked by anyone having adequate series. Dr. Hatch is to be commended for his treatment of the species of *Philonthus* and *Quedius*, based on the male genitalia, and illustrated by sketches. The drawings of the secondary sexual characters of *Tachinus* spp. are also very helpful, as are those of the male genitalia of *Dianous* and *Stenus* by Dr. Sanderson.

The figures of species, nearly all by Mrs. Helen Houk, are a major part of the book and are invaluable to a person trying to key out some unknown entity. They are clear and well reproduced, yet in some cases they fail to suggest the habitus of the species, and even of the genus. For instance the reviewer has been familiar with *Staphylinus maxillosus villosus* Gravenhorst (pl. XXVII, fig. 8), *Eumalus nigrellus* LeConte (pl. XXXI, fig. 3) and *Dianous nitidus* LeConte (pl. XXXI, fig. 11) for years, yet the illustrations did not suggest these species to him at first glance. Many are shown with the front legs trailing backward like the middle pair (so as not to interfere with the drawing of the antennae), instead of held forward as in life.

Mention of the generic name *Staphylinus* draws attention to the one feature which is likely to draw criticism, especially in Europe where there is much interest in the proposal of *nomina conservanda*. It is the use of generic names *sensu* Blackwelder (1952. The generic names of the beetle family Staphylinidae with an essay on genotypy. Smithsonian Institution, U. S. National Museum, Bulletin 200: iv + 483 pp.). This results in transfers of well-known names and the use of others virtually unknown since their proposal. But for collectors on the Pacific Coast this possible annoyance is far outweighed by the blessing of having workable keys to genera and species in a most difficult group.

The subfamily Aleocharinae is given short treatment: in part it is simply a listing of species, with references. This is surely not to be criticized, for on the basis of Seever's preliminary studies it is clear that Fenyes' groupings, based largely on tarsal formulae, were polyphyletic. There is still a tremendous amount of work to be done in the subfamily before we are ready for a stable text-book coverage.

As in Volume I, the keys to species are long, containing as they do the descriptions of new species. With judicious underlining one can turn them into synoptic keys, much quicker to use.

Drs. Hatch and Sanderson and Mr. Marsh are to be congratulated for having brought out an indispensable and stimulating work. It has no predecessor in an area extending from Alaska to Mexico and from the shores of the Pacific to the Rockies. We look forward to Volume III, confident of its adequacy. —Hugh B. Leech, *California Academy of Sciences, San Francisco.*

NEW SPECIES AND RECORDS OF NEARCTIC PSYCHODIDAE

(Diptera)

LAURENCE W. QUATE

Bishop Museum, Honolulu, Hawaii

Since the publication of a revision of North American Psychodidae (Quate, 1955), additional information on Nearctic psychodids has acumulated. To be able to incorporate this into the forthcoming catalogue of Nearctic Diptera, the unpublished data are presented at this time. Included are descriptions of three new species of *Telmatoscopus* and one of *Threticus* and new distributional records for other Nearctic psychodids.

This paper is in effect a supplement to my 1955 revision, and to understand the relationships of the new species to previously described ones, the reader is referred to that earlier study. New distributional data for known species are given where the range has been extended to U.S. states not listed in that revision. Abbreviated biblographic citation only is given to the complete references given in 1955. In the case of generic reassignments, the reader is referred to Quate (1959) for details on the classification of the Psychodini.

Mr. W. E. Snow and Dr. R. H. Jones have provided interesting material, and their efforts and interest in collecting psychodids are appreciated. I also thank other collectors, listed with the collection data, for loans or gifts of specimens.

TRICHOMYIA NUDA (Dyar). Quate, 1955:119.

TENNESSEE: Morgan Creek, Kentucky Reserve, Decatur County, VII-7-54 (W. E. Snow); Sugar Tree, Decatur County, V-26-55, tree hole (Snow).

TRICHOMYIA WIRTHI Quate. Quate, 1955:119.

TENNESSEE: Edgemoor, Anderson County, VII-28-55 (Snow).

PERICOMA SCOTIAE (Curran). Quate, 1955:127.

COLORADO: Grand Lake, Grand County, VI-2-32 (H. G. Dyar); Steamboat Springs, 12 mi. S., Routt County, VII-24-55 (Quate).

PERICOMA LASSENICA LASSENICA Quate. Quate, 1955:130.

COLORADO: Steamboat Springs, 12 mi. S., Routt County, VII-23-55 (Quate).

PERICOMA KINCAIDI Quate. Quate, 1955:141.

COLORADO: Steamboat Springs, 12 mi. S., Routt County, VII-24-55 (Quate). IDAHO: Bear Lake, Bear Lake County, VI-25-48 (D.

G. Denning). ONTARIO: Black Ash Creek, Collingwood Township, V-23-55 (F. P. Ide).

PERICOMA SICULA Quate. Quate, 1955:145.

CALIFORNIA: Mt. Lassen, 3 mi. E., Lassen County, VII-8-52 (J. W. MacSwain).

TELMATOSCOPUS VARITARSIS (Curran). Quate, 1955:161.

MASSACHUSETTS: Holliston, Middlesex County, VI-21 (N. Banks).

Telmatoscopus latipenis Quate, new species

(Figs. 1 *a-j*)

Male.—Species similar to *quadripunctatus*; antenna with long scape, first flagellar segments with enlarged node; head and prothorax without sensory organs; wing with dark spots at apices of veins, other markings not discernible (pinned specimens unavailable); base of aedeagus very broad. *Head:* eyes separated by distance equal to nearly four facets, interocular suture convex with posterior spur at midline; frons with hairs arranged in rectangular patch on anterior part and band extending posteriorly nearly to suture; palpus about one-quarter as long as antenna, ratio of segments 5:6:6:10. Antenna with 16 segments, as figured. *Wing* narrow, three times as long as wide; membrane without infuscations; venation as figured. Sternite two of abdomen a narrow, strap-like sclerite. *Genitalia* as figured.

Measurements: antenna 1.4 mm.; wing length 1.9 mm.; wing width 0.6 mm.

Female.—Unknown.

Pupa.—Respiratory horn rather short, dark brown, surface reticulate, inner chamber expanded distally; double row of pits interrupted near center. Details of ornamentation on abdomen as figured.

Holotype male, MADISON, DANE COUNTY, WISCONSIN, May 22, 1954, adult reared from pupa (R. H. Jones), deposited in the U.S. National Museum. Male paratype, same data.

T. latipenis would key out to *varitarsis* in my key (Quate, 1955:158) but can be distinguished from that species by the unusually broad aedeagus, the enlarged first flagellar node of the antenna and the medial fork being well basad of the level of the radial rather than near the same level as in *varitarsis*.

Telmatoscopus subtilis Quate, new species

(Figs. 1 *k-o*)

Male.—Species similar to *nebraskensis*; antenna with long scape, basal flagellar segments with short internodes; head and prothorax without sensory organs; wings apparently unmarked (pinned specimens not available). *Head:* eyes separated by distance equal to two and one-half facets, interocular suture convex; frons with spatulate hairs arranged in rectangular patch on anterior part and band extending posteriorly nearly to suture; palpus about one-third as long as antenna, ratio of segments 7:10:10:17. Antenna with

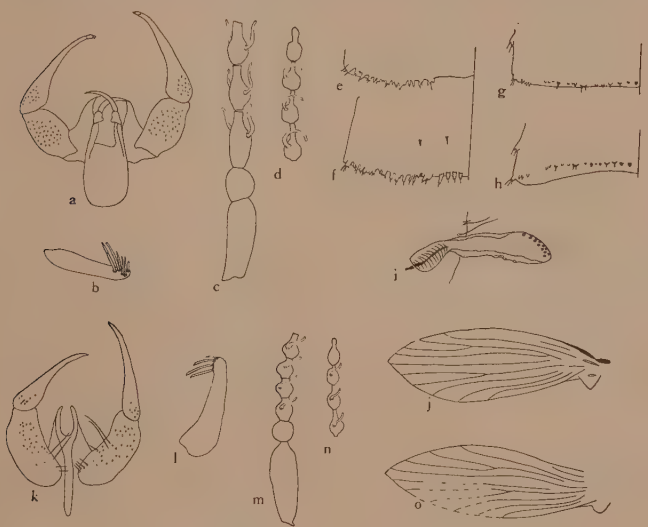
16 segments, as figured. *Wing* narrow, three times as long as wide; membrane lightly infuscated in costal and anal cells; venation as figured. Sternite two of abdomen a narrow, strap-like sclerite. *Genitalia* as figured, aedeagus Y-shaped.

Measurements: antenna 1.4 mm.; wing length 2.4 mm.; wing width 0.8 mm.

Female.—Unknown.

Holotype male, TAJIQUE, TORRANCE COUNTY, NEW MEXICO, June 28, 1947 (R. H. Beamer), deposited in the University of Kansas collection.

This species would key out to *T. quadripunctatus* in my key (Quate, 1955:158) but can be separated by the quadrate appearance of the basal flagellar segments, different shape of the male aedeagus and longer, more slender dististyle. It is most closely related to *nebraskensis* Quate (1955:163) but is separable from that species in that R_5 ends beyond the wing apex and the male



EXPLANATION OF FIGURES

Fig. 1, *a - j*, *Telmatoscopus latipenis* Quate, *a*, male genitalia, dorsal; *b*, male surstyle; *c*, base of male antenna; *d*, tip of male antenna; *e*, pupa, sternite four; *f*, pupa, sternite five; *g*, pupa, tergite four; *h*, pupa, tergite five; *i*, pupa, respiratory horn; *j*, wing. *k - o*, *Telmatoscopus subtilis* Quate. *k*, male genitalia, dorsal; *l*, male surstyle; *m*, base of male antenna; *n*, tip of male antenna; *o*, wing.

aedeagus has a longer basal stem and hence shorter arms than in *nebraskensis*.

TELMATOSCOPUS NEBRASKENSIS Quate. Quate, 1955:163.

WISCONSIN: Madison, Dane County, V-22-54 (R. H. Jones).

TELMATOSCOPUS PATIBULUS Quate. Quate, 1955:167.

MISSISSIPPI: Tishomingo, Tishomingo County, VI-2-56 (Snow).

TELMATOSCOPUS FURCATUS (Kincaid). Quate, 155:169.

WISCONSIN: Dane County, VI-11-53 (L. Limpel); Washburn County, VIII-8-50, light trap (R. H. Jones). KANSAS: Manhattan, Riley County, VI-8-32 (C. W. Sabrosky). COLORADO: Estes Park, Larimer County, VIII-11-52 (R. R. Dreisbach). OREGON: Hood River, Hood River County, VI-19-17 (F. R. Cole).

TELMATOSCOPUS SUPERBUS (Banks). Quate, 1955:183.

TENNESSEE: Tusculum College, Greene County, V-2-46, light trap. NEBRASKA: Lincoln, Lancaster County, VI-30-54, larva *ex* maple tree hole (Quate and E. W. Hamilton). KANSAS: Lawrence, Douglas County, light trap (A. R. Barr).

Telmatoscopus macdonaldi Quate, new species

(Figs. 2 *a-i*)

Male.—Species similar to *superbus;* head and prothorax without sensory organs; apparently vestiture light in color, wings with dark spots at apices of veins (pinned specimens unavailable); dististyle of male genitalia sigmoid-shaped. *Head:* eyes separated by distance equal to about two facets; interocular suture nearly straight; frons with hairs arranged as triangular patch on anterior part and narrow band extending posteriorly to suture; palpus about three-fifths as long as antenna, ratio of segments 6:12:11:15. Antenna with 16 segments, as figured.

Measurements: antenna 1.3 mm.; wing length 2.2 mm.; wing width 0.8 mm.

Female.—Similar to male. Eyes separated by four facets; wing membrane lightly infuscated. Genitalia as figured.

Measurements: antenna 1.3 mm.; wing length 2.5 mm.; wing width 1.0 mm.

Pupa.—Respiratory horn light brown, i.e., of body color, inner chamber of uniform width; row of pits interrupted near center. Details of ornamentation on abdomen as figured.

Holotype male, SANTA MONICA CANYON, LOS ANGELES COUNTY, CALIFORNIA, October 30, 1954, adult reared from pupa *ex* maple tree hole (W. A. McDonald), deposited in the California Academy of Sciences. Allotype female (CAS) and paratype female, same data as holotype.

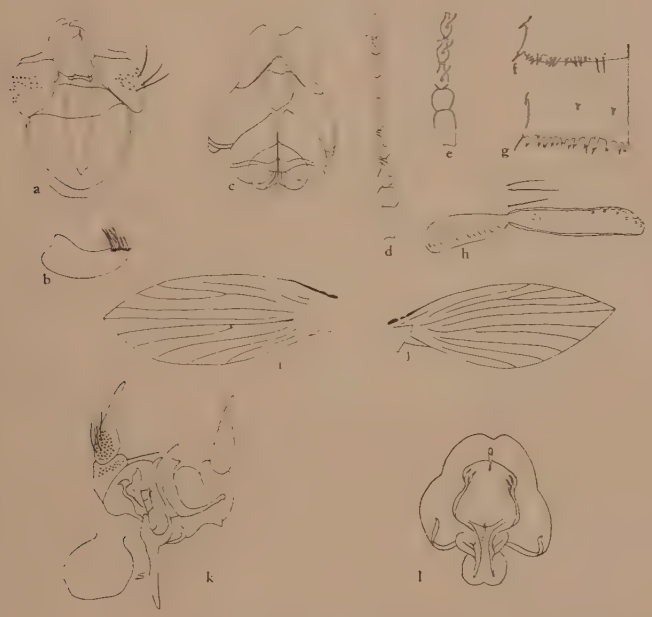
T. macdonaldi would key out to *superbus* in my key (Quate,

1955:158) but may be recognized by the male and female genitalia; the sigmoid dististyle of the male and the lack of tennis racquet-shaped structure on the face of the female subgenital plate (as in *superbus*) being the most obvious recognition characters. Otherwise. the two species are similar and hard to separate.

This species is named in honor of Dr. W. A. McDonald, who collected the types and has made other interesting psychodid collections in California.

PSYCHODA SETIGERA Tonnoir. Quate, 1955:202.

TENNESSEE: Decatur, Meigs County. V-16-56. oak tree hole (Snow).



EXPLANATION OF FIGURES

Fig. 2, *a - i, Telmatoscopus macdonaldi* Quate. *a*, male genitalia, dorsal; *b*, male surstyle; *c*, female genitalia; *d*, base and tip of male antenna; *e*, base of female antenna; *f*, pupa, sternite four; *g*, pupa, sternite five; *h*, pupa, respiratory horn; *i*, wing. *j - l, Threticus bicolor* (Banks). *j*, wing; *k*, male genitalia, dorsal; *l*, female genitalia.

PSYCHODA MINUTA Banks. Quate, 1955:203.

TEXAS: Kerrville, Kerr County, XI-53 (L. J. Bottimer).

PSYCHODA PUSILLA Tonnoir. Quate, 1955:206.

OREGON: Hood River, Hood River County, VII-9-17 (F. R. Cole). WASHINGTON: Endicott, Whitman County, VII-12-56; Oaksdale, Whitman County, VI-13-56; Pullman, Whitman County, VII-18-56; Anatone, Asotin County, VI-30-56. All specimens reared from cow dung, except one from pig dung.

PSYCHODA RAROTONGENSIS Satchell. Quate, 1955:208.

GEORGIA: Savannah, XI-3-55, "privy trap" (H. R. Dodge).

PSYCHODA TRINODULOSA Tonnoir. Quate, 1955:208

WISCONSIN: Madison, Dane County, IV-29-54, light trap (R. J. Dicke).

PHILOSEPEDON INTERDICTA (Dyar). Quate, 1955:227, 1959:449.

WISCONSIN: Madison, Dane County, XI-29-53, *ex* slime on dead oak tree.

THRETICUS JONESI (Quate). Quate, 1955:231; 1959:450.

MISSISSIPPI: Tishomingo, Tishomingo County, VI-2-56 (Snow). TENNESSEE: Sugar Tree, Decatur County, VII-7-54, tree hole (Snow).

THRETICUS BICOLOR (Banks). Quate, 1955:233; 1959:450.

NEBRASKA: Morse Bluff, Saunders County, VI-(5, 10, 11)-57 (Quate); same, VI-14-55 (W. F. Rapp, Jr.).

The illustration of the male genitalia by Quate (1955, fig. 82a) is incomplete, and a more accurate illustration is given here (fig. 2k). In the male specimen drawn previously a sclerotized rod adjacent to the main shaft of the aedeagus apparently was lost in the dissection, and the new figure shows the complex aedeagus with the full complement of parts.

The females of the Nebraska specimens differ from those in the eastern U.S. by the absence of a pair of horn-like structures distad of the spermatheca. A new figure (fig. 2l) of the female genitalia is given here based on the specimens from Nebraska.

The above specimens were collected in sedges growing in a moist, shady area at the base of a bluff where clear water seepage kept the ground wet and muddy. *Telmatoscopus furcatus* (Kincaid) was collected at the same place in association with *bicolor*. Immature stages of *furcatus* were strained from the

mud, but none definitely associable with adults of *bicolor* were found.

MARUINA LANCEOLATA (Kincaid). Quate, 1955:239.

COLORADO: Steamboat Springs, 12 miles S., Routt County. VII-24-55 (Quate).

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A NEW SPECIES OF ANEFLOMORPHA CASEY ASSOCIATED WITH CITRUS IN ARIZONA

(Coleoptera: Cerambycidae)

JOHN A. CHEMSAK

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The genus *Aneflomorpha* Casey, as currently defined, comprises nineteen described species, sixteen from the United States and three from northern Mexico. The larvae are twig borers and girdlers in broad-leaved trees. Those of *A. subpubescens* (LeConte) attack and destroy young oak and chestnut seedlings and sprouts, and *A. lineare* (LeConte) girdles twigs of oak (Craighead, 1923). The adults are nocturnally active and are frequently attracted to light.

The following species, because of its occurrence on citrus in Arizona, may have some economic significance. The author is indebted to Dr. P. D. Gerhardt, University of Arizona, and Dr. E. G. Linsley, University of California, Berkeley, for the opportunity of describing this species, and to the latter also for the use of his manuscript key to the species of *Aneflomorpha*.

Aneflomorpha citrana Chemsak, new species

Male.—Form elongate, slender; integument uniformly dark brownish testaceous; pubescence moderately dense, fairly short, subrecumbent and suberect. *Head:* coarsely, densely, subconfluently punctate on vertex and between eyes, densely pubescent; antennae exceeding elytral apices by more than one segment, segments three to six spinose at apices, ciliate internally, spine of third segment longer than second segment, spines on segments four to six rapidly decreasing in length, sixth very short, segments three to nine carinate above, eleventh segment appendiculate, scape coarsely confluently punctate. *Pronotum:* longer than broad, sides broadly rounded, surface coarsely confluently punctate, faint traces of an irregular dorsal callus evident, moder-

ately densely clothed with rather long white subdepressed pubescence, sides with few longer erect hairs: prosternum slightly concave, coarsely, confluently punctate at about basal half, punctures subequal to pronotal ones, apical half with a distinct elevated transverse ridge, entire apical half transversely rugulose, pubescence moderate, short, subdepressed and suberect: prosternal process narrow, expanded at apex, front coxal cavities open behind by less than width of prosternal process: metasternum densely pubescent. *Elytra:* slightly less than three and one-half times longer than broad, sides subparallel, surface coarsely, irregularly subconfluently punctate at base, punctures subequal in size to those of pronotum, becoming finer apically: pubescence moderately dense, subdepressed, not obscuring the shining integument: apices emarginate, bidentate. *Legs:* slender, sparsely clothed with short subdepressed and longer suberect pubescence: femora coarsely, densely, shallowly punctate: tibiae carinate. *Abdomen:* sparsely, finely, shallowly punctate, moderately densely pubescent: fifth sternite broadly subtruncate at apex. Length, 11–14 mm.

Female.—Antennae extending over first three abdominal segments: abdomen with fifth sternite truncate at apex. Length, 12–15 mm.

Holotype male, allotype female and seven paratypes (five males, two females) TEMPE, MARICOPA COUNTY, ARIZONA, August 3–5, 1956 and August 18, 1959 "on citrus" (P. D. Gerhardt). Holotype and allotype deposited at the California Academy of Sciences, paratypes in collections of the University of Arizona and California Insect Survey.

This species is evidently related to *A. duncani* Linsley but differs by its smaller size and paler color. The elytra are shorter, antennal segments three to six spinose, and three to nine carinate. The color of *A. citrana* is somewhat variable in the type series, ranging from a brownish testaceous to dark brown. The other morphological characteristics are fairly constant, both quantitatively and qualitatively.

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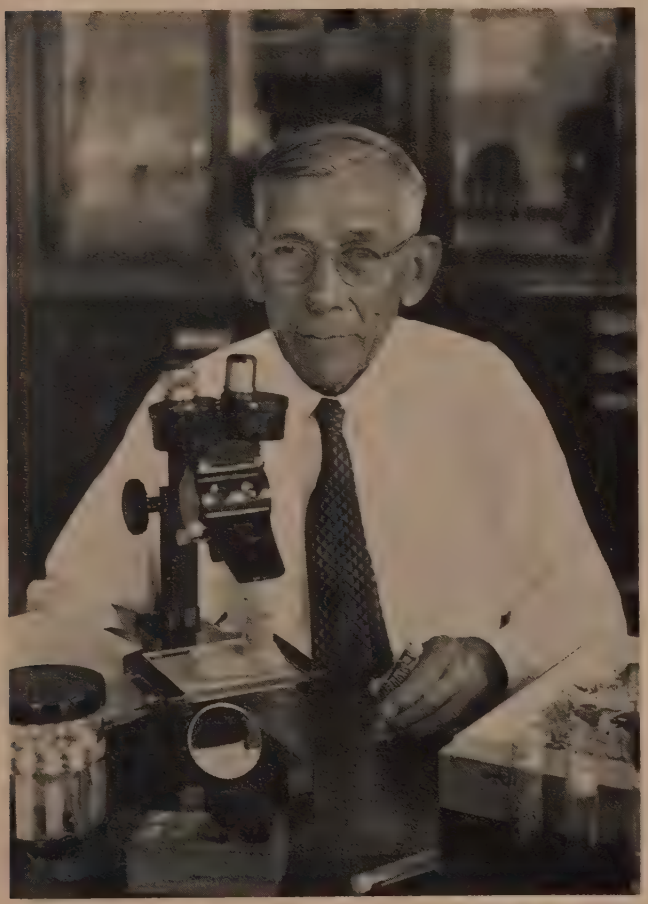
1923. North American Ceramycid Larvae. Canada Dept. Agr. Bull. 27 (n.s.), 151 pp., 45pls.

ERRATA

Powell, Jerry A. 1960. Pan-Pac. Ent. 36(2):84; line 40, read VI-25-56 (A. A. Lee); "Coastal Area" instead of VI-25-26 (A. A. Lee); "Costal Area."

OTTO HERMAN SWEZEY



Entomologists the world over were saddened by news of the death of Dr. O. H. Swezey on November 3, 1959 at the age of 90. Dr. Swezey was born June 7, 1869 at Rockford, Illinois. He attended Lake Forest College, Illinois (B.A., 1896), Northwestern University (M.A., 1897) and Ohio State University (1902-1904), where he was a student of leafhoppers under Herbert Osborn. The greater part of his professional life (1904-1952)

was spent in the Hawaiian Islands as entomologist in the Experiment Station of the Hawaiian Sugar Planters. In 1944 he was granted an Honorary Degree of Doctor of Science by the University of Hawaii. From 1952 to the time of his death he lived in retirement in San Jose, California.

O. H. Swezey was a completely unique personality — modest to a fault and of unusually calm disposition. He was much interested in the teachings of the Baha'i faith. He was a vegetarian and abstained from the use of tobacco and alcoholic beverages. A patron of the arts, he rarely missed attending symphony concerts and other musical events.

Dr. Swezey's greatest interest in entomology was the insect fauna of the Hawaiian forests. His special talents were the close observation, patient rearing, and faithful reporting of the biology of insects. No fact was too small to attract his attention and every fact was instantly available thanks to a prodigious memory. He was an expert botanist and hence was able to contribute many hundreds of host plant records, most of which were brought together in his definitive work "Forest Entomology in Hawaii." Fortunately, this summary and approximately 230 other titles carry the bulk of Dr. Swezey's contributions over to posterity. The section, "Notes and Exhibitions" in each issue of the Proceedings of the Hawaiian Entomological Society provided an important outlet for the hundreds of detailed observations reported by Dr. Swezey at the monthly meetings from 1904 to 1952.

Although more of a biologist than taxonomist, Dr. Swezey's record of field collecting of native insects is most impressive. Only R. C. L. Perkins, who did the basic field work for the Fauna Hawaiiensis, and F. X. Williams approached Swezey's record in the Hawaiian Islands. Elsewhere, Dr. Swezey made extensive collections in Guam (1935-36) with R. L. Usinger, and Samoa (1940) with E. C. Zimmerman. His material is preserved in the collections of the Hawaiian Sugar Planters' Experiment Station and the B. P. Bishop Museum in Honolulu.

Dr. Swezey went to Hawaii in 1904 as an economic entomologist. His achievements, both as an individual and as head of the distinguished team of entomologists at the HSPA during the 1920's and '30's, are now legend. The sugar cane leafhopper was brought under control by the introduction of natural enemies, thus saving the sugar industry that appeared to be doomed.

Dr. Swezey played an important part in introducing other beneficial insects and summarized the case for the biological control of Lantana, a pioneer work on control of noxious weeds by insects.

Dr. Swezey continued on at the HSPA long after his official retirement, giving generously of his time and knowledge. In later years, although handicapped by partial blindness and deafness, he continued to rear insects and study their biology.

After his arrival in California Dr. Swezey lost no time in affiliating with the Pacific Coast Entomological Society. He and Mrs. Swezey attended three meetings in 1953 and, at the age of 83, he was elected to "Retired" membership in the Society on November 28, 1953. Typically, at the meeting of October 30, 1953 he reported on the rearing of a cutworm at his home in San Jose. From a single larva he reared 1051 parasites, an instance of polyembryony. Dr. Swezey was the principal speaker at the 235th meeting of the Society on March 6, 1954. His topic was "Some Aspects of the Endemic Insect Fauna of Hawaii." The last meeting he attended was the Field trip to Mt. Diablo, May 22, 1954.

Dr. Swezey is survived by Mrs. Swezey of San Jose, California and his son, Joseph, and two grandchildren in Hawaii.

—R. L. USINGER AND E. C. ZIMMERMAN

A NEW SPECIES OF CRASSOMICRODUS ASHMEAD

(Hymenoptera: Braconidae)

PAUL M. MARSH

University of California, Davis

Crassomicrodus muesebecki Marsh, new species

Female.—Length, 7 mm.; black except mandibles, all femora, anterior tibia, and basal two-thirds of middle and hind tibiae, which are ferruginous; body covered by long silvery hair. Head entirely black, transverse; clypeus prominent, more than twice as broad at apex as long; anterior tentorial pits deeply impressed; malar space equal to or slightly less than one-half the eye height; cheek and temple smooth, polished, frontal impressions immargined; ocellocular line nearly four times the diameter of an ocellus; antenna 30-segmented, nearly as long as body, scape large; mandibles bidentate. Thorax entirely black; notaulices very weakly defined; scutum and scutellum smooth and polished; prescutellar furrow bisected by one prominent median longitudinal carina and two lateral carinae; pronotum finely punctate; mesopleura smooth and polished, mesopleural furrow distinctly foveolate, long, curving upwards; propodeum sloping from base to apex, not rounded, rugulose.

Wings dark, veins dark brown; hind wing with five frenular hooks. Legs, all coxae and trochanters black, upper portion of trochanter lighter basally; all femora ferruginous; tibiae ferruginous, middle and posterior tibiae blackish basally (in some paratypes ferruginous area of posterior tibia replaced by white coloration); inner spur of posterior tibia equal to one-half basitarsal length; tarsus dark. Abdomen black; entirely smooth and polished; ovipositor 2 mm. long, strongly exserted, curved downward, sheaths black.

Male.—Essentially as in female.

Holotype female.—CALIFORNIA: FRESNO COUNTY, 7 MILES SOUTHWEST OF TRIMMER, June 2, 1951 (C. D. MacNeill). Cat. No. 64,876 U.S. National Museum.

Paratypes.—6 males, 7 females, all from California as follows. MADERA COUNTY: Bass Lake, 1 male, VI-6-38 (R. M. Bohart); NEVADA COUNTY: Rucker Lake, 1 female, VII-5-49 (E. I. Schlinger); PLUMAS COUNTY: Bucks Lake, 1 male, VI-23-49 (D. Cox); RIVERSIDE COUNTY: Idyllwild, 1 male, VI-19-51 (R. C. Bechtel); Keen Camp, 1 male, 3 females, VI-31-39 (B. Brookman, W. C. Bush, R. F. Smith), VI-9-39 (E. S. Ross); Ribbonwood, 2 females, V-21-40 (C. D. Michener); TUOLUMNE COUNTY: 1 male, 1 female, III-9-38 (N. W. Hardman); YOLO COUNTY: Rumsey, 1 male, V-30-56 (R. M. Bohart).

Type and four paratypes deposited in the U.S. National Museum, four paratypes in the California Insect Survey collection, three paratypes at the University of California at Davis, one paratype in the California Academy of Sciences, and one paratype in the author's collection.

This species differs from other *Crassomicrodus* by its strongly, rather than barely, exserted ovipositor. There is some variation in the color of the wings and posterior tibia in the specimens I have examined. In all the specimens from southern California the wings are hyaline, while those from central and northern California have the wings dark. Those specimens with hyaline wings apparently all have four frenular hooks and those with dark wings have five hooks. Also the color of the hind tibia is white (except at apex) in those specimens from southern California, rather than ferruginous as in the central and northern California specimens.

Dr. C. F. W. Muesebeck has kindly reviewed the manuscript and has aided my studies in many other ways. The species is named for him in recognition of his pioneer work on American Braconidae.

SYMMOCA SIGNATELLA H.-S. IN CALIFORNIA

(Lepidoptera: Gelechioidea)

Symmoca signatella Herrich-Schaeffer is a widespread species in Europe which has apparently recently been introduced into California. Meyrick (1895)[1] reported that the moth was introduced into the London and Paris areas during the late nineteenth century and that the larvae had been stated to feed on lichens. Recent collections I have examined indicate that it is now widespread in agricultural and urban areas of California. Dr. J. F. Gates Clarke of the U.S. National Museum, who kindly identified the species, states *(in litt.)* that the U.S.N.M. has specimens from Los Angeles, Riverside, and Yorba Linda (Orange County), the latter reared from lemon mummies. Ebeling (1959)[2] lists *S. signatella* as a minor pests of citrus, but it seems likely that it is a general scavenger as a larva and will be found in decaying vegetable matter associated with various plantings.

Data from material examined: Anaheim, Orange Co., III-29-43, r. f. arbor vitae trash (H. H. Keifer); Fresno, Fresno Co., V-30 to VI-3-56 (R. O. Schuster); La Mesa, San Diego Co., VI-3, 10-59, light trap (R. A. Mackie); Redwood City, San Mateo Co., IX-24, 30-59 (P. H. Arnaud, Jr.).

—JERRY A. POWELL, *University of California, Berkeley.*

A CORRECTION IN THE EYE NUMBER OF THE GENOTYPE TOMOLONUS REDUCTUS MILLS

(Collembola: Entomobryidae)

While examining samples of berlesed material for Collembola, specimens of a tomocerine were found which appeared to be *Tomolonus reductus* Mills. These specimens agreed with the original description of this species in every respect except for the number of eyes. It was stated that there were two eyes on each side, located at the anterior edge of an irregular black eyespot (Mills 1948)[3].

The specimens observed by the author possessed three eyes on each side, two on the anterior edge, the posterior one completely within the eyespot. It is sometimes very difficult to locate this third eye because of the pigmentation.

Recently an opportunity arose whereupon the cotypes were examined and it was found that these also possessed three eyes

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[1] Meyrick, E. 1895. Handbook of British Lepidoptera. MacMillan Co., London, 843 pp.

[2] Ebeling, W. 1959. Subtropical Fruit Pests. Univ. Calif. Div. Agr. Sci., 436 pp.

[3] Mills, Harlow B.—New North American Tomocerinae. Ann. Ent. Soc. Amer. 41(3):353-359.

on each side instead of two. Dr. Mills is in agreement with this.

The type locality of *T. reductus* is Hastings Natural History Reservation, Monterey County, California. To this date it is known in California from the following additional locations: Oakland, Alameda Co., 1953., Ione, Amador Co., 1956.—RICHARD F. WILKEY, *California Department of Agriculture, Sacramento.*

NOTE ON SYNONYMY OF AN AMERICAN AND JAPANESE SPECIES OF PSYCHODIDAE

(Diptera)

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At the suggestion of Prof. M. Tokunaga, Saikyo University, Kyoto, Japan, a comparison was made of the American species, *Telmatoscopus niger* (Banks), and the Japanese *Telmatoscopus spinitibialis* Tokunaga and Komyo. Prof. Tokunaga generously sent me a male and female paratopotype of *spinitibialis*, and the following conclusions are based on those specimens as well as the original description of that species.

A number of striking characters readily identify *T. niger*. The eye bridge is curved down medially above the antenna instead of being straight as is the usual case; the nodes of the first two flagellar segments of the antennae are fused, and the first flagellar segment is reduced and lacks an internode; the wing is rather narrow; the radial sector is pectinate; and the male and female genitalia are distinctive. In addition, the male has a large spine from the apex of the mid tibia, and the mid basitarsus is larger than the following tarsal segments. [Dr. Tokunaga and Miss Komyo had based the name of their species on the tarsal spine; but I had overlooked it in the redescription of *niger* (Quate, 1955:165).] Insofar as I can ascertain, there are no differences between *T. niger* and *spinitibialis*.

The synonymy of *T. niger* is as follows:

TELMATOSCOPUS NIGER (Banks)

Psychoda nigra Banks, 1894, Canad. Ent. 26:331 (type locality, New York).

Maruina nigra, Kertesz, 1902, Catalogus Dipt. 1:302.

Telmatoscopus niger, Quate, 1955, Univ. Calif. Publ. Ent. 10:165 (descr., illus.).

Psychoda snowhilli del Rosario, 1936, Philip. Jour. Sci. 59:140 (type locality, Maryland).

Telmatoscopus spinitibialis Tokunaga and Komyo, 1955, Philip. Jour. Sci. 84:217 (type locality, Honshu, Japan). *(New Synonymy.)*